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# SOUTHERN GOOD ROADS

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## Eastern Division of Dixie Highway

Specially Written for Southern Good Roads

**W**ITH the construction of the Dixie Highway in Bell county, Kentucky, well under way, and the preparations which are being made for the building of the highway in Rockcastle, Laurel and Knox counties, Kentucky, the officials of the Dixie Highway Association are confident that the Eastern division will be open for travel within the next twelve months. At a recent Dixie Highway meeting in Knoxville, President M. M. Allison of the association made the statement that he was confident that the eastern division would be ready for through tourist travel in advance of the western division.

Believing that the counties where the highway is yet to be constructed will carry out their agreement for the building of their sections of the road within the next twelve months, arrangements are now being made by the Dixie Highway Association for a big tour over the Eastern division of the highway starting at Detroit, Michigan, during the fall of 1916. The tentative plans provide for a spectacular military feature in connection with the tour of officials over the highway. The Northwestern Military Academy will probably enter their armored cars, manned by cadets of that institution. War tactics will be worked out by them as they approach each city and town. A battery of motor trucks to carry the commissary equipment will be provided and the officials and tourists on the tour will camp out at each night control. All of the meals will be cooked out in the open.

At the present time there is only one barrier to through travel over the Eastern division. This consists of about seventy miles of road to be constructed in Kentucky in the three mountain counties of Rockcastle and Laurel, each with bond issues of \$100,000 in addition to state aid, while Knox county has the proceeds of a bond issue of \$200,000 in addition to state aid. Bell county has the grading on the Dixie Highway practically all completed, and a part of the surfacing. The remainder of this work will be pushed as rapidly as possible. The most modern methods in road construction are being used in Bell county under the personal direction of Judge T. J. Asher, a builder of more than local reputation. Two powerful Marion steam shovels, ten ton trucks, extra heavy steam rollers, and other modern equipment, all owned by the county, are being used. It has been stated that it is Judge Asher's intention to surface this well built section of road with Tarvia or some other Bituminous material.

With the proceeds of the \$378,000 bond issue in Claibourne county, the construction of the Dixie High-

way from Cumberland Gap toward Knoxville is progressing in a very satisfactory manner. Union and Knox counties are prepared to build their sections, in the event that it is routed through Union county.

### Tennessee Will Be Ready.

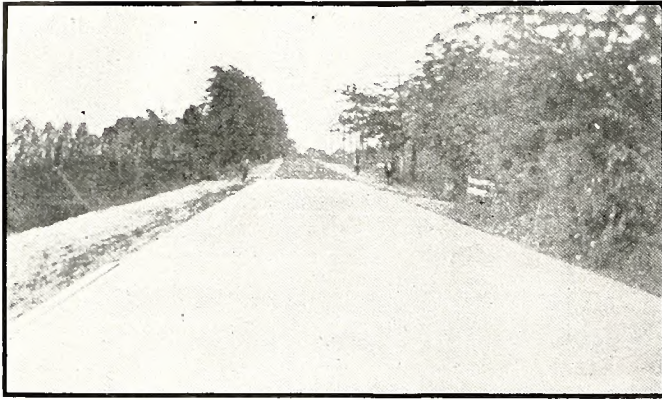
Should the Tennessee commissioners award the routing of the Dixie Highway between Knoxville and Cumberland Gap through Anderson and Campbell counties, ample financial preparations have been made for its construction along this route.

Knox and Loudon and Rhea counties between Knoxville and Chattanooga are finishing up their uncompleted stretches as rapidly as possible. This work will be completed within six months. The Dixie Highway in Georgia is now in good condition, and all of the counties are rapidly surfacing all remaining stretches. The only section of the highway south of Chattanooga not in the best of condition, is between Waycross, Ga., and Jacksonville, Fla., on the eastern division, and in Florida on the western division. This is being placed in condition just as rapidly as possible, and will be completed in ample time for tourists to travel over a fine road from Chattanooga to any point in Florida a year hence. The road between Macon and Jacksonville via Waycross on the recently designated eastern division in eastern division in Georgia is travelable now, although not as highly improved as it will eventually be.

With the exception of the Monroe, Mich., Toledo, Ohio section, the Dixie Highway from Detroit through Toledo, Dayton, Cincinnati, O., Lexington, Ky., to Richmond is in good passable condition. The Ohio counties have in mind the paving of their part of the Dixie Highway from Toledo to Cincinnati. A portion of it is now hard surfaced, and counties are preparing to add to the mileage of hard surfaced roadway during 1916. The funds have been raised for the construction of the Toledo-Monroe road, and the work has been started. Prior to the advent of the Dixie Highway movement it had been impossible to get anything done. With the beginning of activities for the Dixie Highway in Ohio, a campaign was started simultaneously in Toledo and Monroe resulting in \$75,000 being raised to assist in the construction of this section of the highway.

Wonderful progress has been made in the construction of the Dixie Highway since April 3rd, last, when the movement was first launched in Chattanooga at the Conference of Governors. In response to a recent request sent out to all of the counties on the Dixie

Highway for information relative to the amount which has been spent exclusively on the Dixie Highway in



Concrete Road in Kenton Co., Ky., part of Dixie Highway, 18 feet wide concrete 8 inches at centre 6 inches at side, cost \$18,800 per mile. Constructed with Fencing Wire Reinforcement and Soft Steel Expansion Joints

the past six months and an estimate of the amount to be expended within the next year, reports to date show a progress much greater than anticipated.

#### Some of the Expenditures.

From the reports received by the Dixie Highway Association to date from fifty counties out of a total of 162 counties, there has been expended the stag-

gering sum of \$1,765,200 on the Dixie Highway alone, in these counties in the past six months. As these counties have not been selected for their special progress but were taken as they come, it is reasonable to suppose that they are typical of the average.

On the basis of 162 counties, multiplying the total shown by the reports by three, to be conservative, over \$5,300,000 has been expended on the Dixie Highway since the movement was first started.

The reports by states show that in seven out of eighteen counties in Kentucky there was expended \$135,000. In Ohio, eight counties out of twelve and not including Hamilton county of which Cincinnati is the county site, expended \$388,000. Five counties out of twenty-two in Florida spent \$601,000 on the Dixie Highway in the past six months. Six counties out of eighteen in Tennessee spent \$173,000. Four counties out of five in Illinois and not including Cook county of which Chicago is the metropolis, spent \$252,000 in the past six months, while ten counties out of twenty-four in Georgia spent \$95,000. And yet this large expenditure is only a small proportion of the expenditures to be made, as many of the counties have merely made preparations for going to work on their section of the Highway and their money will not be available until later.

In the fifty counties reporting to the association, provisions have been made for spending \$6,931,000 on the Dixie Highway alone. Again using the multiple of three, the total is in excess of \$20,000,000. To the uninitiated, this immense sum of money for the construction of the Dixie Highway may seem preposterous and



Typical Free Stone Box Culvert on the Dixie Highway and Boone Way in Bell County, Tenn.

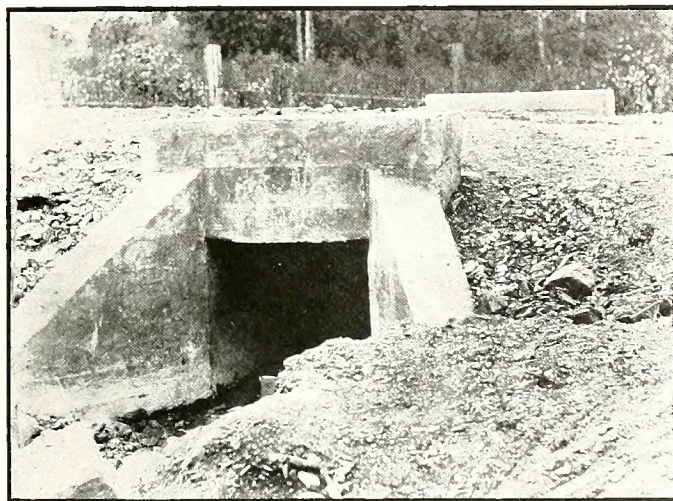
out of reason. Yet when the statement is itemized by counties the reasonableness of it can be plainly seen.

This amount is divided by states as follows:

Illinois .....	\$1,250,000
Ohio .....	1,204,000
Tennessee .....	924,000
Florida .....	2,505,000
Indiana .....	126,000
Kentucky .....	765,000
Georgia .....	151,000

The bond issues which have been voted in the state of Florida alone during the past six months is now in excess of six million dollars. The majority of these counties are traversed by the Dixie Highway and the Highway will receive a goodly portion of it. It can be conservatively stated that within the next six months this bond issue will be doubled as far as the state of Florida is concerned. Bond elections for the month of January alone will be called to vote on over three million dollars worth of bonds. Two counties in that state have set their goal at a million dollars in bonds.

From the reports received from the fifty counties ov-



Typical Concrete Bridge on the Dixie Highway and Boone Trail in Bell County, Tenn.

er 367 miles in these counties are either paved now or contracted for, using either concrete, brick or asphalt. From a survey of the entire highway on the basis of the reports submitted, it is safe to say that a seventh, or over 600, of the entire mileage of the Dixie Highway System is paved. By the end of 1916 over three hundred miles will have been added and at the close of 1917 will see at least a third of the entire mileage a paved road on the very lowest possible estimate.

This is not taking into consideration the effect that through travel over the highway in the meantime will have in getting counties to pave their section with concrete or some permanent material. W. W. Marr, Chief State Highway Engineer of Illinois, states that within two years the entire mileage of 156 miles in his state will be paved. County officials in the Ohio counties between Toledo and Cincinnati, state that the entire distance of about 220 miles will be paved.

Mr. Carl G. Fisher states that the entire mileage between Jacksonville and Miami totaling 360 miles will be paved. There will be over 300 miles of paved road on the Western division in Florida. Other counties between Illinois and Florida are now putting in permanent road. The effect of the steady stream of tourist travel over the highway will materially increase the

mileage, so that the estimate given may be considered very conservative.

#### Campaign Along Meridian Highway.

A campaign that will surpass that which was carried on along the Lincoln Highway and the National Old Trails Road, which practically completed those roads across the continent and which was considered the greatest undertaking in the history of road building, will be launched along the Meridian National Highway in the near future. This campaign will be started under the joint auspices of the Texas Good Roads Association, the Meridian Highway Association and the National Highways Association. The purpose will be to stimulate interest in this great Highway, which forms the back-bone of the National System proposed by the National Highways Association for the federal government to take over, standardize and maintain.

A party will leave Laredo and traverse the entire route in automobiles, inspecting every inch of the road and arranging for sign posts. Logs will be made showing the exact route of the highway and containing a review of local conditions in each and every town traversed by the road, together with a brief history of same. This will be printed in pamphlet form and distributed all over the United States for the purpose of giving publicity to the road and inducing tourists to come to Texas along this route, rather than going to California and Florida, as has been the custom in the past. Pictures will be taken along the road by the party and these will be used in newspapers, good roads magazines and automobile journals.

The success of this most laudable project depends on the interest manifested by the citizens along the road who are to be the beneficiaries of the work. Committees in each town, no matter how small, should be appointed to meet the party and escort them from their town to the next. These committees should be men who are thoroughly familiar with local conditions, so that they can assist these gentlemen in getting all necessary information.

Mr. E. J. Hernan, assistant director general of the National Highways Association, will accompany the party and will later hold meetings in every town along the road. Mr. Hernan was a strong factor in the campaigns along the National Old Trails Road and the Lincoln Highway, and is the "Father" of the first National Road Day ever held in the United States. He says the Meridian Road is the most important in the entire National System, and its early completion will mean more to Texas and its development than any other one thing. "Let us make a strong pull and a pull together" said Mr. Hernan, "as they have along other National Highways, and we will soon see this great Highway not only completed, but signposted throughout its entire length."

#### Building Highway in Desert.

Contract was let last month by Riverside county, Cal., supervisors for an important piece of desert highway, 13.43 miles between Indie and Mecca. The contract was awarded to the Brashear-Burns company of Los Angeles for \$33,892.28, the county to furnish all materials. The total cost will be \$78,000. But ten miles of the county highway system between Riverside and the Colorado river now remains unprovided for. This road will form a part of the ocean to ocean highway.

Twenty-six miles of fine shell road in Alvin county, Texas, has been completed and is now in use.

# Kentucky Has Live Commissioner

**Robert C. Terrell Has Made Good, and Has the Accomplishments to Show For It**

**K**ENTUCKY'S Road Commissioner, Robert C. Terrell, who has successfully put into operation the good roads laws of Kentucky and for the past three years has been the head of the road department, was born near Bedford, Trimble county, Kentucky, in 1884. After finishing the common school of that county, he entered the state university of Kentucky and graduated from that institution in 1906, receiving the degree of bachelor of engineering, and was given the master's degree in civil engineering in 1908.

Immediately after receiving his degree in 1906, he took charge of the location of the Duck Fork extension of the Louisville & Atlanta railway, now a portion of

trustees of the state university of Kentucky, there was established the chair of rural and highway engineering in the department of civil engineering of that institution. He was unanimously chosen professor of that chair. He immediately began the campaign to secure not only the undergraduate students in the course, but also arranged to have the practical roadbuilders of the state to take short courses and attend lectures during the winter season. The course grew very popular, and many students were enrolled in both the two and four-year courses for under-graduate students and large numbers of the county road men, as well as the county judges and magistrates matriculated for the lecture courses.

## Called From University Chair.

In 1912, when the department of public roads was established by the general assembly, Governor McCreary called Mr. Terrell from the chair of rural and highway engineering of state university of Kentucky and appointed him the first commissioner of public roads of Kentucky. Mr. Terrell assumed his duties on July 1, 1912, and has untiringly given his time and attention to the upbuilding of the road system of the road system of the state. Through his efforts and the showing made by the department prior to the meeting of the general assembly of 1914 was made possible the passage of the state aid road laws in Kentucky, which provide for intercounty seat system of highways and a five-cent tax, together with the license tax on automobiles to be spent for the construction of the state system of highways, the state paying one-half the cost and the county one-half the cost of such improvement. This law also provides that when the counties vote bond issues and the fund is spent under the supervision of the state road department, the state will pay back one-half the cost. Under the state road fund general, the county and state will spend approximately one and one-half million dollars this season. In addition to that, fourteen counties have voted bonds aggregating nearly three million dollars.

Mr. Terrell, through his splendid corps of assistants and thorough organization, has had active supervision and charge of the preparation of the plans, specifications and estimates of cost and actual construction of more than one thousand miles of road, and has thoroughly demonstrated to the citizens of the Commonwealth of Kentucky the advantage of having roads constructed on scientific principles, and has made popular the new road laws and has been successful in securing the co-operation of the county officials throughout the state.

Mr. Terrell, when interviewed on the subject, stated he was well pleased with the success of the new road laws, and that a good showing had been made this year, and that fully fifty per cent more work would be accomplished during the year 1916, as the county officers of nearly every county in the state have already signified their intention of taking their pro rata part of the state aid fund for the coming year, and many more counties are preparing to vote bond issues.

## Building the Dixie Highway.

After the selection of the route of the Dixie highway by the commissioners appointed by the governors of the states through which the highway was to pass,



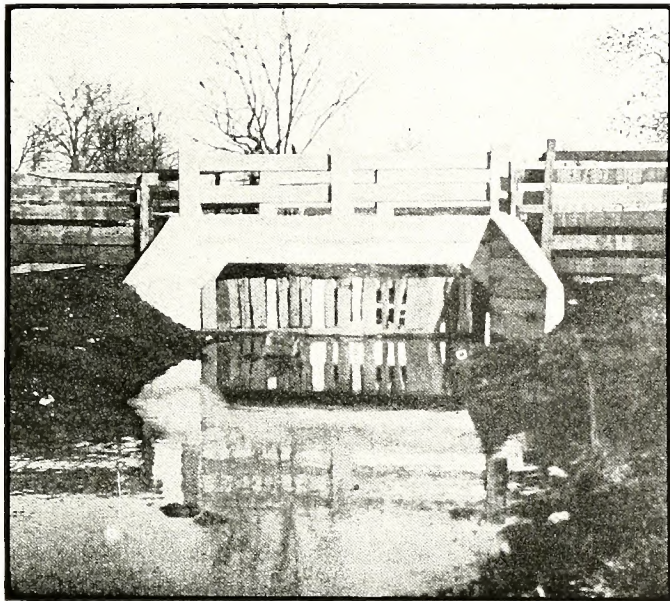
ROBERT C. TERRELL  
Commissioner of Public Roads, Frankfort, Ky.

the L. & N. system. In addition to locating the road, Mr. Terrell mapped and opened up a large coal field for the Kentucky River Coal & Coke Co., which was afterwards leased by the Big Hill Coal Company of Pennsylvania. In June, 1907, after completing the work with the Kentucky River Coal & Coke Company, Mr. Terrell was employed by the Arkansas, Louisiana & Gulf Railway at Hamburg, Arkansas, as assistant engineer on twenty miles of construction, where he remained until its completion in the summer of 1908.

Through Mr. Terrell's influence with the board of

work was immediately commenced in each of the counties traversed by the west branch of Kentucky.

True to the promise made by Governor James B. McCreary and State Commissioner of Public Roads



Shelby County, Ky., Bridge on Shelbyville-Eminence Pike

Robert C. Terrell, at the first Dixie highway meeting at Chattanooga, the state aid work was pushed rapidly upon both branches of the Dixie highway in Kentucky.

Beginning at the northern boundary of Kentucky, at Louisville, the road passes southward over a recently constructed rock asphalt road for a distance of six miles, and thence over a waterbound macadam road to a new bridge across Salt river at West Point, Ky., and from that point over a newly reconstructed waterbound macadam road a distance of twenty-four miles to Elizabethtown. From Elizabethtown south to the Hart county line, and on to Mumfordsville, the county seat of Hart county, and thence south to Cave City, over a newly resurfaced waterbound macadam road. The road is being resurfaced from Cave City to Bowling Green. Recently, a splendid bridge has been erected across Barren river, just north of Bowling Green, a description of which accompanies photo of same in this issue.

A road from Bowling Green to Russellville is also in the process of reconstruction and will be completed very shortly. Contract has recently been let for the gap in the macadam road south of Russellville on the road to Adairville, which is near the Tennessee line.

This will be a splendid waterbound macadam road and will be completed within the next six months from Louisville on the north boundary line to Adairville, near the south Kentucky boundary line on the road between Russellville and Springfield, Tenn. The reconstruction on the whole line is being done under the direction and the supervision of the Kentucky state department of public roads.

#### Greatest Road Building Year.

The greatest year of roadbuilding ever seen in Kentucky has been this season, and without doubt the amount of construction along this line will be fifty per cent greater in the year 1916.

Many of the counties by concerted efforts are connecting up roads that reach entirely across the state. "The Dixie highway"—both the east and west branch—is being built by the counties through which it pass-

es, as well as the "Jackson highway" and the "McCreary way," traversing the state east and west from the Big Sandy on the Virginia border to Mills Point on the Mississippi. The "Dixie Bee Line," the "Jeff Davis," and a number of other roads have been planned, and the counties are assisting the state in getting these roads completed as rapidly as possible. The east branch of the "Dixie Highway" follows the route of the "Boone Way" through Bell, Knox, Laurel and Rockcastle counties, and it is interesting to note that each of these counties have voted bond issues to construct their roads. Bell county voted a bond issue of \$250,000, Laurel and Rockcastle each \$100,000. Whitley county has voted a bond issue of \$200,000, and is building roads which will connect with the "Boone Way" and the east branch of the Dixie Highway.

#### "The Boone Way."

"The Boone Way" will be completed, if everything goes as planned, by the fall of 1916, and will afford easy access from the blue-grass section of Kentucky into the mountains and over the Cumberland gap to the splendid roads in Virginia and East Tennessee. There is on foot a movement at the present time to extend the "Boone Way" over Cumberland Gap on through the mountains of North Carolina. The construction of this road through the mountain section of Kentucky will be somewhat difficult, in view of the fact that limestone is not available east of Mt. Vernon in Rockcastle county, except in a vertical ledge outcropping in Pine mountain, at Pineville, Bell county, Ky., and it will be necessary to ship stone a considerable distance for the construction of this branch of the highway.

Mr. T. J. Asher, county judge of Bell county, Ky., is giving Commissioner Terrell splendid co-operation in the construction of that portion of the road through Bell county, and the work has been pushed rapidly this season. Two steam shovels were used in grading the road between Pineville and Middlesboro, a distance of twelve miles, and the steepest grade on this road is six per cent. A crushing plant has been installed at Pineville, and a bituminous limestone macadam road has been constructed over a portion of this road, making one of the most beautiful roads that could be imagined in a strictly mountainous country, being sixteen feet of macadam on a twenty-foot subgrade.

A great deal might be said of the work in Lewis, Gremp, Jefferson, Woodford, are highly pleased with results obtained, and stated that much credit was due to Governor James B. McCreary for the splendid co-operation he had given the road department this season. He feels certain that if the policies of the department are continued, Kentucky will have a system of roads connecting up each and every seat in the state with the county seats of the adjoining counties, and with the state line on the most direct and practical routes to the county seats of the border counties of adjacent states.

This work can be completed within the next five or six years, and will make a system of roads for Kentucky comprising 6,500 miles, which will serve more than eighty per cent of the population of the state.

Van Zandt county, Texas, is now completing its portion of the Texas, Louisiana and Arkansas highway. \$145,000 bonds have been issued for work in the county.

Craven county, N. C., has let the contract for the building of 15 miles of model road near New Bern.

# Maintenance

By H. G. SHIRLEY

Chief Engineer Maryland Road Construction

**W**HEN we look up the meaning of the word "maintenance" in the dictionary, we find that the definition given is "to sustain; to keep from decaying; to keep up to a constant state of preservation," but so often the true meaning of this word is violated, or is only partially carried out in road work, that we blush with shame when we are reminded of its true meaning. The maintenance of a road is a continuous process, and requires much care and thought. It is folly, and even criminal, for a legislature or other body to create a bond issue or appropriate large sums of money to construct roads without making adequate provision for their up-keep. The maintenance of a road



Typical Concrete Bridge on New Construction Work in Lewis County, Ky., Under \$150,000 Bond Issue Plan

should start the day it is accepted from the contractor, and should be given constant care and attention thereafter, with, possibly, the exception of two or three months during the winter, when the ground is thoroughly frozen or covered with snow, but as soon as the weather starts to moderate, maintenance should immediately start.

It is necessary, before estimating the cost of maintenance, to classify the roads as to the type of construction and the amount and character of traffic that passes over them, for it is impossible to make a correct estimate of such costs until this information is given. In this discussion, I have assumed that a proper study has been made previous to building, and the most economical type of construction selected, both from the standpoint of construction and maintenance.

The maintenance methods used by the speaker have been the patrol and gang systems—all the oiling work being let by contract.

In maintaining earth roads, we find that after the

road has been properly shaped, the ditches opened, and the road given the proper cross-section, a patrolman with a log-drag can keep from five to eight miles in good condition for at least ten months in the year. The patrolman drags the road after each rain, when the earth is in a moist and damp condition, and thus the road is kept smooth and to the proper cross-section. When the road is dry, and the surface is in good condition, the patrolman spends his time in opening up the gutters, filling any small washes that may occur in the shoulders, and if there are any spots in the road where the earth is soft, and of such a nature that it will not bear the traffic, he digs this out and fills it in with good material. In places where there are wet spots, due to the lack of proper underdrainage, and such places the patrolman digs out, fills them with stone or logs, making blind drains. We have found that by laying a layer of field stone, and putting in three logs, laying them so as to form a trough, and then filling over with stone, a very efficient underdrain can be made that will eliminate all wet spots. The patrolman spends his time doing this character of work during the time that the road bed is not in condition for dragging, but just as soon as it rains and the earth gets in condition, he devotes the balance of his time to dragging and shaping up the road bed.

To properly maintain this type of road, the cost will range from approximately \$40 to \$100 per mile per year—depending largely upon the character of the soil upon which the road is built, as well as upon the amount and kind of traffic.

I cannot impress too strongly upon you the great importance of properly maintaining earth roads, for it will be many years before the "earth road" will be in the minority, and in many places it will not be economical, or will the taxable basis justify the construction of a higher type. The speaker is of the opinion that we will have to look to Mother Earth for quite a number of years to come to supply material with which to build many miles of our roads throughout the country.

A thorough study of the soils, proper locations, and the proper treatment of earth roads, are subjects to which we cannot devote too much time and brainwork, for we will be recompensed by a great improvement in this type of road by such study.

Heretofore, the earth road has been left to be maintained by the most ignorant—in fact, it was not maintained at all, it being commonly understood that it would take care of itself, requiring no work, except, perhaps, the cutting away of the bushes, and possibly a road machine in the early spring to throw up the sides and give it drainage. I know of no type of road that has been abused and that has received the careless and inefficient maintenance to which the earth road has been subjected, and no type of road upon which so much money has been wasted as on the earth road, primarily through neglect and ignorance. I have seen instances where a soft spot would occur in a hollow, where the underdrainage was bad, and from year to year a large amount of stone would be hauled and dumped in this spot and would disappear by late spring, but nevertheless this procedure would be re-

ligiously adhered to each and every season following until the stone finally settled down and practically formed a solid mass, making a mud hole at each end, and the same performance would again have to be repeated the next year at each end, until a large quantity of stone again displaced the mud and formed a hard and compact surface. This is expensive road maintenance, and if a drain, as before outlined, were put in, the bad spot would dry up, and that portion of the road would be as good as the adjoining section, and at a very small cost.

Earth roads should be worked in the early spring. If the roadbed is rutted up, in bad condition, and flat, without the proper cross-section, it should be plowed from gutter to gutter, shaped with a road machine until it has the proper cross-section, and then kept constantly dragged until it is properly consolidated. After the road has been given this attention, then with a little, but constant, care, it can be kept in good condition until the freezing and thawing is at hand, when it is necessary to dig again just as soon as the frost leaves the ground.

#### **"Top Soil Roads."**

The top soil roads is a type of road that is ranked a little higher than the earth road, and in many places, where a good top soil can be secured, it makes a most excellent road for almost the entire year. This is next in cost to the earth road, and in many of the southern states it has been the most economical and has given excellent service.

The maintenance of the top soil road is similar to that of the earth road, with the exception that when the top soil surface breaks into holes it should be repaired by applying additional fresh top soil, but, like the earth road, it requires constant dragging. I have seen top soil roads practically rebuilt by the process of maintenance. When a patrolman observes that this road shows signs of weakness by holes breaking through, if he hauls fresh top soil and spreads it on the surface, the road will be kept in a most excellent condition, and at the same time its thickness will be increased by reason of the addition of the fresh top soil, and in a few years it will be in such a condition that it will withstand the heaviest traffic in wet weather without rutting or going to pieces.

The greatest care should be exercised in the selection of the proper kind of top soil for patch work—the patch being made similar to that on the earth road. Where the road is in bad condition, it is found economical at times to plow the entire road bed, re-shape it, and apply another layer of top soil, but this procedure is, as a rule, quite unnecessary if the road has been properly maintained, and it should never be allowed to get in a condition that would necessitate such treatment. However, with the proper kind of patrol or gang system, this will not occur.

The cost of maintaining top soil roads varies as to the availability of top soil and the haul of the material to the road to which it is to be applied, and ranges close to the cost of maintaining earth roads, but exceeds it where the haul is excessive, and is anywhere from \$50 to \$150 per mile per year.

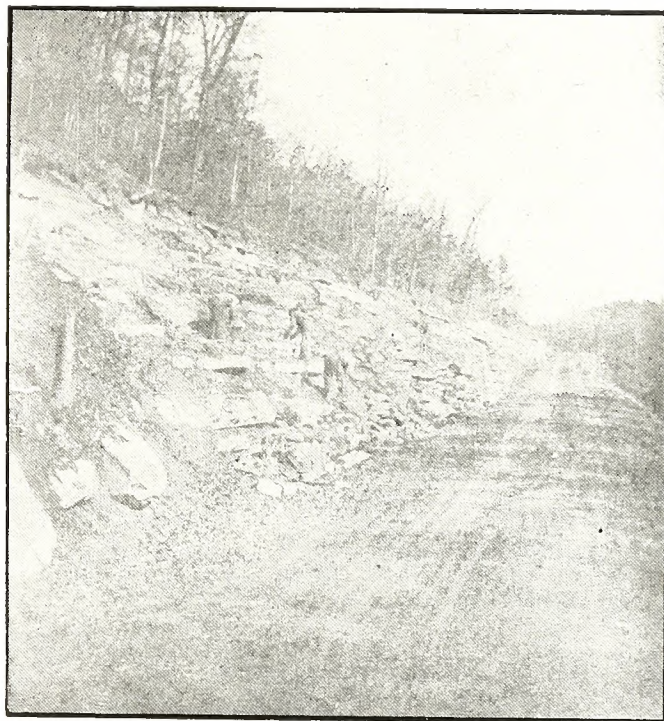
#### **Gravel Roads.**

I know of no type of road that needs more constant maintenance than the gravel road under heavy automobile traffic. It is necessary to keep a constant watch on this kind of a road, for when a rut or hole occurs in the surface it must be filled at once, for if it is neglected it will very rapidly disintegrate.

The patrolman should be supplied with gravel placed at short intervals along the side of the road, so that when a small break occurs the gravel will be conveniently at hand, and can be applied at once and tamped in.

The gravel used for patching purposes should have a certain percentage of binding material, and should be thoroughly tamped in place in the ruts and other breaks in the roadbed.

The application of oil on gravel roads has not been entirely satisfactory, i. e., as far as the speaker's experience goes, and the use of "Glutrin" is more preferable where the gravel has a binding material of



Quarrying Sandstone for Foundation Course in Lewis County, Kentucky. Improving Roads Under \$150,000 Bond Issue

clay. I have found that "Glutrin" on clay-gravel gives very good results. It binds the road, keeps it from ravelling, and makes it more water-proof.

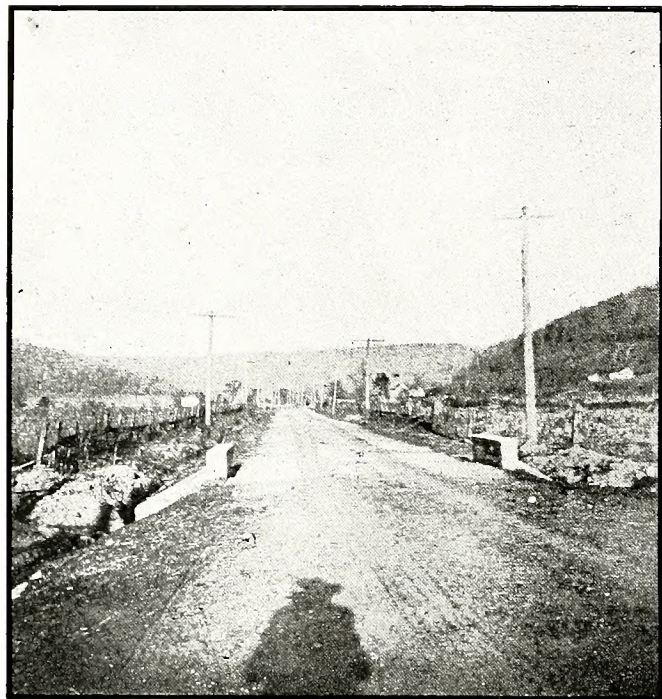
The cost of maintaining gravel roads varies greatly with the traffic, the accessibility of gravel, and climatic conditions, ranging from \$100 to \$500 per mile per year, depending almost entirely upon the amount of heavy motor truck traffic.

#### **Macadam Roads.**

To properly maintain a macadam road under heavy motor traffic, which is so universal these days, it is necessary to treat the road with an asphalt or tar at least once every three years—and better, once every two years. Under exceedingly heavy traffic, it is most advisable to treat it every year. I shall refer to this oil treatment later, under the head of "Oil Roads."

Where the traffic is only moderate, the gang system works economically and well, but where the traffic is either very light or very heavy, the patrol system is preferable as far as securing the best results is concerned. From a practical standpoint, however, the patrol system in such a case is not so economical, but the maintenance of the road is brought to a higher efficiency. In the case of a road that is either much or little travelled, the gang does not visit the road often

enough to catch up any defects that may occur. In fact, there is always a tendency to postpone the placing of a gang on a stretch of road until there is something of real importance to be done. This, we know, lowers the efficiency of maintenance, for the road is generally pretty far gone before the work necessary is considered of sufficient importance to require a gang, and a road should never be allowed to go long enough to require very much work to be done at any one point. The patrolman, therefore, who has from five to seven



Finished Road in Lewis County, Kentucky

miles of road to care for, can get over it two or three times a week and repair any section as soon as it shows signs of disintegration.

Our patrolmen are supplied with bituminous patching material and stone chips, and as soon as they see any abrasion or small depression in the road they are supposed to patch it with tar or oil and cover it with stone chips, but great care must be taken not to put on too much oil, for it will push about and make a hump.

It costs from \$200 to \$600 per mile per year to properly maintain a macadam road, i. e., to keep it in good condition—in fact, better than the day it was accepted from the contractor.

#### Bituminous Macadam Roads.

The bituminous macadam road is maintained similar to the macadam road, care being taken to keep a seal coat on it wherever the road shows signs of breaking or going to pieces, and it is necessary to have a patrolman supplied with a heavy asphalt, or tar, and chips to cover any spots that show signs of going to pieces. If a bituminous macadam road is kept with a good seal coat on it at all times, it will give excellent results, and last a long while. In many instances where the oil has been poured by hand, and in an uneven manner, the road pushes and forms in humps or waves. When this is the case, one of the best ways to remedy it is to take a road plow and plow the entire road bed up for a depth of from 3 to 4 inches, pick it all loose with picks, mix sufficient additional stone to give it the proper mixture of stone and oil, and where fat spots

occur, take out the surplus quantity of oil, and remove it to other spots where there appears to be an insufficient quantity of oil, re-shape the roadbed, and then roll it down again. The speaker just finished treating a number of miles of road where the waving of the surface occurred, and where it had become very rough and uneven. I do not think that in the treatment of the 5 or 6 miles of road we used more than 20 tons of additional stone, and no additional oil at all. After the road was re-shaped and rolled down until hard and firm, nothing will be necessary to be done to it until another year, when it will be necessary to put on a new seal coat, but as the road rolled back in such a hard and compact condition, we did not deem it necessary to apply the seal coat this season. This treatment takes out the waves and make the surface of the road very smooth and even.

In plowing up the surface of one of the bituminous macadam roads in the state, it was found that the stone under the top surface of the oil were intact, and practically in the same condition as the day they were laid. They resembled new stone very much, both as to their appearance and the amount of dust on them, just as if they had come from the quarry, and showed no marks of being exposed to the weather, or of even having the physical changes that take place in a macadam road. Of course, where the oil is absolutely dead, and has not enough life in it to roll back and bind, it is necessary to and a certain quantity of new oil to give it life. The treatment I have just outlined will remedy the waving and humping that is so often found in the bituminous macadam road, and I think will have a tendency to popularize more than ever, this type of construction.

The cost of re-shaping the road ranges from \$300 to \$400 per mile, and the maintenance costs, along with this, will average, from year to year, from \$200 to \$400 per mile per year, depending upon the amount of traffic.

#### Bituminous Concrete Roads.

Bituminous concrete roads are maintained in a similar manner to the bituminous macadam roads, only, in the case of the bituminous concrete road, we mix a batch of the bituminous mixture the same as in the roadbed, and where a break occurs, we dig out the bituminous surface and apply an entire new block of material, tamping it, and then spreading same over with stone chips. A bituminous concrete road can be laid either on a macadam base or on a concrete base, but it is essential in either case that the seal coat be renewed every 3 or 4 years and a covering of good trap rock screenings used. This will very materially prolong the life of a bituminous concrete road.

The cost of maintaining this type of construction during the first 4 or 5 years ranges from \$100 to \$300 per mile per year, and during the period between the ninth and eleventh year, between \$400 and \$500 per mile per year.

#### Concrete Roads.

The maintenance of the concrete road consists mainly of pouring the joints with a bituminous mixture and sweeping out the cracks, and patching same. Where there is a failure in the concrete surface it is necessary to dig it out and put in a new piece, patching the edges with tar where the new joins the old. We have experienced no difficulty in patching concrete roads by putting in a new piece of concrete and patching around the edges with tar. The repairs to our concrete roads up to date have, however, consisted prin-

cially in pouring the joints and cracks with a tar wherever they occur, and covering them over with stone chips. The cost of maintaining concrete roads vary as to the amount and character of traffic and other conditions, and as far as the speaker's experience goes, runs from \$100 to \$150 per mile per year. However, as the longest period the speaker has maintained any concrete road is only about 5 years, he is not in a position to absolutely say what the average maintenance would be for a longer period of time.

#### Brick, Stone Block and Asphalt.

Standard pavements are generally maintained by replacing the defective parts with the same type of surfacing that is used in the original construction.

#### Patrol and Gang Systems.

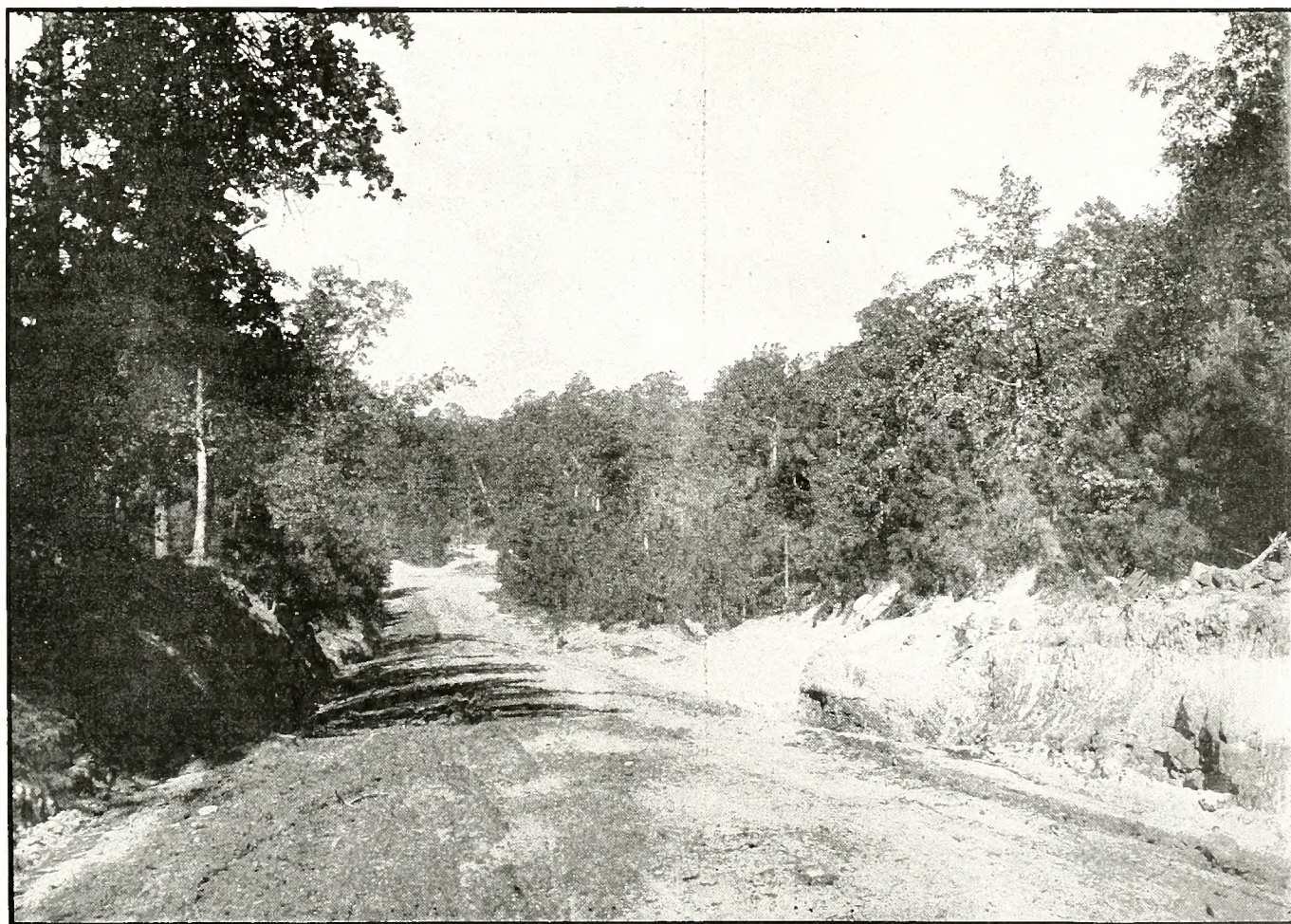
The patrolman on the work is supplied with a cap, bearing the title "State Patrolman," a number, which he wears on his left arm, by which he is designated; a log drag; and 8in.x8in. square rammer; a long handled round pointed shovel; a steel wheel-barrow; a pick; a mattock; a 16-inch rattan broom, a 4-gallon galvanized springling can; a weed scythe; a red flag; a 10-gal. heating pot on wheels; report cards; traffic cards; instruction book; pay roll, and classification sheets. The outfit, including the heating pot, costs \$25, and without the heating pot, costs \$10. Stone chips and oil should be placed along the road at intervals of about every 1000, so that no matter where a break occurs in the road, he will have a pile convenient which he can reach quickly with his wheel bar-

row, secure the necessary materials, and make the patches.

The gangs consist of a foreman, from 7 to 10 men, and two teams, equipped with a camp wagon fitted up with sleeping apartments and cooking outfit, a road scraper, dump wagons, planers, log drags, and the other necessary small tools. If the gang is operating on macadam repairs, a scarifier and steam roller are added to the equipment. A gang can look after from 50 to 60 miles of road, depending on the type of construction, and the intensity of traffic. The gang travels over the entire section, making all repairs necessary, and keeping the surface in a smooth and good condition. On gravel roads, they add gravel as soon as a depression or weak spot develops; on macadam roads, they keep the surface covered with oil, and make repairs as soon as bare spots begin to show, look after dragging of the shoulders, cutting the grass, opening the ditches and waterways, and the general up-keep of the entire road.

#### Oiling Roads.

During the past season, all the oiling in Maryland was done by contract, the contractor furnishing the oil, sweeping the road and applying the oil. The state, with its own forces, bought, delivered, and spread the stone chips to cover the oil. A price was given for the oil per gallon, f. o. b. factory, and freight rates given to points of delivery, also a price for applying the oil per gallon, in applications from 1-5 to 3-4 gallons per square yard. The sweeping was paid for by the square



U. S. Object Lesson Road, Nacogdoches, Texas. Sand Clay Road and Division Ditch

yard. The oils were applied by a pressure distributor, driven by a motor truck.

In 1912 applied 625,000 gallons oil on 182 miles at cost per mile of \$350.

In 1913 applied 950,000 gallons oil on 326 miles at a cost per mile of \$346.

In 1914 applied 1,400,000 gallons oil on 457 miles at a cost per mile of \$354.

In 1915 applied 1,400,000 gallons oil on 500 miles at a cost per mile of \$350.

We have used from 50 to 80 tons of stone chips per mile this year, being larger in size than the stone heretofore used, ranging from 3-4 in. to 1 in. As soon as the stone chips were spread on the road, a roller followed and rolled them into the surface of the road. This was done in order to make the surface of the road smooth, and to prevent the stone chips from being wasted.

About 500 miles of road were oiled this year. Every mile of macadam road built by the State Roads Commission has been oiled either during previous years or during the past season. We have no waterbound macadam road that has not been treated from one to three times with asphalt or tar, and we have been increasing the amount of stone chips from year to year, and at present it averages from 60 to 80 tons per mile, depending, of course, upon the amount of traffic and the amount of oil used. We are also using larger sized stone chips this year, and on some contracts, used two different sizes—first about 50 tons of the large stone chips and then about 30 tons of the small pea sized gravel or stone. On heavy traffic roads, where traffic uses the road while the oiling is being done, the speaker recommends first, an application of large stone chips, thoroughly rolled into the surface; following this application, within 48 hours, an application of small stone chips or pea gravel, which should also be rolled. The pea gravel prevents the bituminous material from being picked up by the traffic passing over the road.

A total of 500 miles of road were oiled in Maryland in 1915, and 950 miles were maintained by the State Highway Department. The average cost of oiling this year will be about \$350 per mile; the average cost of maintaining 748 miles of road in 1914 was \$464 per mile, and the average cost of maintaining 950 miles of road in 1915 will be about \$450.

Mr. Shirley (continuing): As to the gang system and the patrol system, we started out with the patrol system and then we had an idea the gang system would be very much preferable to the patrol system. We changed certain sections into the gang system and now we are going back on certain roads to the other. The gang system is more economical—not very much, but some—but the gang system is not as preferable as the patrol system. The patrolman is on the job every other day in the year and when a small break occurs he is there to patch it, and the roads are kept up. There is never a break or a flaw in the road, but it is kept in perfect condition by the patrol system. The patrolman is constantly on the job, he is there to make the patches.

If you put on the road each year as much as wears off, your road will never wear out. The funds with which we maintain these roads is derived from the automobile tax; that tax goes to the maintenance of state and state aid roads. And we charged 50 cents on the hundred dollars. That has not been quite sufficient to maintain the roads, but the automobiles have so increased in number that this year the automobile tax and the one cent state tax will take care of our main-

tenance and we hope next year the tax from the automobiles alone will maintain the state road system of Maryland. I thank you.

### Old Trails Road Progresses.

The work of building a hard surfaced highway from Kansas City to St. Louis along the Old Trails Road, 303 miles in all, is practically half completed.

Last summer at a good roads meeting held in Kansas City Judge J. M. Lowe, president of the National Old Trails Road Association, proposed that the task of linking the two great cities of Missouri be completed within the year. His enthusiasm was so contagious that the fever of rock road building quickly spread from one road district to another, until now it is safe to predict that another summer will see all of the money needed for the cross-state highway secured.

When the fight to construct Missouri's first great rock began 119 miles of the Old Trails Road had been hard surfaced. This mileage included the hard roads across Jackson, Boone and St. Louis counties, the rock roads through the Lexington and Fulton special road districts, in Lafayette and Callaway counties respectively, and the gravel and rock roads across St. Charles county.

Since then Wellington special road district, the first east of Kansas City, has voted bonds in the sum of \$55,000 to plug its gap in the trail. Between the Jackson county line and the Wellington district line is a 2-mile stretch not included in any road district, but money has been promised the Old Trails Road Association by Kansas City road boosters to care for that bit of the trail.

Waverly district has approved a bond issue of \$49,000 to be expended in hard surfacing the 10.2 miles of the cross-state highway that cuts that district. This means that in Lafayette county alone within the last few weeks the money has been found to rock 24.2 miles of the Kansas City to St. Louis road.

The Saline county rock roads committee is considering plans for rocking 192 miles of road in that county. This plan includes the mileage of the Old Trails Road through Saline. But if the voters do not approve the bonds, Sherman Houston, of Malta Bend, chairman of the county committee, is the authority for the statement that when Lafayette county brings the rock road to the Saline county line, Saline will carry it across to Howard and Cooper counties.

In St. Charles county 1.8 miles of the trail is being rocked this fall. That means 145 miles of the trail either has been rocked or the money provided for it.

### Good Roads and School Houses.

This is the way a Texas editor sees the relation of the good road to the school:

"All good roads lead to a school house. In good roads there is a consideration of the school child. Compel a helpless child to force its way along a mud-fouled thoroughfare and a crime is committed. Its health is endangered and its mind is dwarfed. He who would not strive to overcome a calamity is not civilized though garbed in the broadcloth of an honored citizen. A community should, above all, consider the school children's welfare. The destiny of a nation rests in this careful study and the thoroughfare along which their little feet must travel can not be constructed with too much precision to gain the happy result. Texas can never become great until she becomes civilized."

# Over the Southern National Highway

## Colonel Benehan Cameron Tells Interestingly of Coast to Coast Automobile Tour

**C**OL. BENEHAN CAMERON, of Stagville, member of the North Carolina Highway Commission and vice-president of the Southern National Highway Association, in response to a request for an account of the first tour of inspection over that road gives the following account:

Answering your inquiry about the Southern National Highway, and the recent trip of the first official tour over it, would say that the inception of the idea of its establishment was on October 12th, 1912, at Atlantic City. When I was addressing the directors of the Quebec-Miami International Highway, which had been organized the year before by myself and others, Col. Dell M. Potter, of Clifton, Ariz., heard my talk, and after I had finished said to me: "We have a great highway up the Pacific Coast, from San Diego to Vancouver now; if you get your Atlantic Coast highway built, why wouldn't it be a good scheme to connect these two great highways together by a route sufficiently far south to avoid the snow, ice and sleet in the Rockies, that block the Lincoln and other more northerly routes?" I replied that it would be an excellent scheme, and in fact, we in North Carolina had already started the idea. For we had begun to build the Central Highway from Morehead City on the Atlantic through Raleigh, our capital, where it intersects the Quebec-Miami International Highway and through Asheville to the Tennessee line. And the Tennessee people are building the Bristol-to-Memphis Highway, and we can join that at Knoxville, so we will then be at the Mississippi river, where you can meet us. He replied, "Agreed."

He therefore went home to work on the proposition and I did the same. In December, 1912, I received from him a letter saying he had organized the Tri-State route (Colorado, Arizona and New Mexico) from San Diego to El Paso, and that he thought he had best rest there and see what connection could be made with the two routes. So I asked Governor Kitchin if he would call a convention of all the Southern States to select a route. He agreed to do so. But there was some delay in my correspondence with Colonel Potter. So I asked Governor Craig if he would make the call. He also agreed to do it, and one of the very first of his official acts was this call. Every state in the South except Maryland sent delegates to the convention at Asheville on February 13, 1913, when the organization was effected, and when it was through it would take about thirteen years to build it. Now its completion is in sight. It was organized by the selection of Colonel Potter as president, and I as the vice-president. The route that was selected was voted for by congressional representation, so as to make it perfectly fair. A great many routes were proposed. But the one selected served more congressional districts than any other could possibly serve. For passing through Virginia, North Carolina, Tennessee, Arkansas, and Texas it divided the South in half, with Maryland, West Virginia, Kentucky, Missouri and Oklahoma on the north, while on the south are the states of South Carolina, Florida, Georgia, Alabama, Mississippi and Louisiana.

I got resolutions through the legislatures of North Carolina at sessions of 1913 and 1915, sending greetings to the states through which it passes, asking their

co-operation for an early completion, and each responded handsomely and the counties through which it passed did the same. By these means its completion is now in sight. For each day you can now go from Little Rock, Ark., to San Diego, and from Old Fort, N. C., to Washington, or to Morehead City. The gaps occur between Little Rock, Ark., and Old Fort, N. C., and these are fast closing up. From Little Rock to Memphis some bridges are to be built. At Memphis the bridge over the Mississippi river is to be finished June 1, 1916.

Some gaps between Memphis to Nashville are to be closed, one between Nashville and Knoxville and one between Newport and the State line, when all will be done in Tennessee. And there is a short gap in Virginia, near Dumfries. Then in North Carolina there are two to be closed, one between Hot Springs and Marshall, the other between Swannanoa Gap and Old Fort. This latter is provided for by the bill which we got through the last legislature authorizing the governor to put the State convicts on this mountain section, as we had spent all the money we could get under the Simmons bill for experimental use on postal routes and all that McDowell county had voted to comply with the law.

The old stage road from Old Fort to Swannanoa Gap is four miles. The railroad took twelve and a half to make it, and then arrived 150 feet below the old stage road, and had to tunnel nearly a mile. The new road will follow very much the route of the railroad, but will cut through some of the loops, thus making a grade of 4 per cent. Thus it will be a great blessing to connect the Atlantic slope with the Mississippi Valley on a grade of 4 per cent. over the great Appalachian divide. But we have several approaches to Asheville from the east and southeast that can be used. This old stage road over the Swannanoa Gap—the Hickory Nut Gap, the Hendersonville and Granville routes; but we have absolutely no route available from Asheville west. Hence every effort should be made to close the gap between Marshall and Hot Springs, N. C., and between the state line and Newport in Tennessee.

This is exceedingly important. For there is an immense amount of money to be expended on the Dixie Highway at once to complete it immediately. This intersects the Southern National Highway at Knoxville, and the people to the north in the States of Kentucky, Ohio and Illinois, and which will want to get into our mountains as well as our Southern people to the south of Knoxville, and those west of Knoxville. Hence every effort should be made to close the gaps near the state line. Accordingly I got the mayor of Newport to call a public meeting, and urge its completion.

Those who made the trip from San Diego were Colonel Dell M. Potter, the president; the government engineer, Mr. H. B. Burrell, a magnificent writer, Mr. Wilbur Hall, a representative of the city and exposition of San Diego, which latter will remain open for 1916; Mr. W. B. Gross, and a chauffeur, Mr. B. H. Taylor.

Col. Dell M. Potter had to turn back at Memphis, so he wired me as vice-president to take his place. The report of the government engineer will be made to

the director of the office of public roads at Washington. Articles will be written for the magazines about the trip and many localities will arrange to attend the exposition at San Diego. The party started on Nov. 2 and arrived at Durham on Thanksgiving. They had two days delay on account of rain and high water, one in Arkansas and in West Tennessee. Their average run was 168 miles. Their greatest run was 250 miles, from Roswell, N. M., to Snyder, Tex. Their best road was the concrete road from San Diego to Yuma. Some of the Tennessee roads were very fine. But the average in North Carolina was the best after leaving Yuma.

Now, I wish to call your attention to the fact that it is estimated that \$250,000,000 of American money went to Europe every season before the European war—\$75,000,000 to New England, \$40,000,000 to Colorado, \$30,000,000 to California. So North Carolina should have a share of these large sums and good roads alone can get it. We must thereby capitalize our beautiful scenery and climate. Our mountains are, indeed, a great asset to the state.

### Good Roads Bodies Should Join.

There has come about an unfortunate circumstance which tends to pull apart some of the national forces working for good roads everywhere in the United States. This has led to the proposed holding of separate meetings of the American Road Builders and the American Highway Association. The American Association of State Highway Officials at their recent meeting in Chicago appointed a committee to draft resolutions looking toward amalgamation and to recommend a time for the convening of the National Road Congress with all organizations looking to the same purpose merged into one powerful working body. These resolutions follow:

Your committee appointed for the purpose of preparing resolutions and making recommendations upon the holding of National Road Congress offer the following report, that,

WHEREAS, the attending of the many road congresses has become a serious question with State Highway Officials not only in the time consumed and in the interference with official duty, but also in the matter of expense, and,

WHEREAS, the maintenance of two Associations of National scope working independently and without harmony is a detriment to the good roads movement,

THEREFORE, BE IT RESOLVED, that the members of this Associations oppose the holding of any National Roads Congress prior to December 1, 1916, and do hereby bind ourselves not to attend or participate in any manner in any National Road Congress held prior to that date.

BE IT FURTHER RESOLVED, that we urge the executives of our respective States not to appoint any delegates to represent the said several States in case any National Road Congress is held prior to said date.

BE IT FURTHER RESOLVED, that it is the sense of this Association that for the good of the road movement the American Road Builders and American Highway Associations should amalgamate into one organization, or that they should at least arrange to hold jointly one annual road congress. Should they fail to arrange prior to August 1, 1916, for such a joint congress to be held in December, 1916, or early in 1917 then the Executive Committee of this Association is authorized to designate the date and place of our next meeting, and notify the above associations of the same,

requesting them to hold a joint meeting at that time and place.

Further, that if the said associations shall amalgamate or make a harmonious arrangement for an annual joint congress to be held as above suggested, we hereby pledge the hearty support and co-operation of this association, and,

Be it Further Resolved, that the Secretary of this organization forward to each State Highway Department of the several states not represented at this meeting, also to the Engineering Department, Board of Public Works in all cities of the United States having a population in excess of 100,000 and also to all manufacturers of road machinery, material and supplies, a copy of these resolutions, asking for their approval and co-operation in carrying out the same.

Be it Further Resolved, that a copy of these resolutions be forwarded to the Secretary of the American Road Builders Association and to the Secretary of the American Association.

Be it Further Resolved, that the vote upon the adoption of these resolutions be by roll call of the states here represented and that said vote shall become a part of these resolutions.

### Two Big Highways to Mobile.

Mobile will soon be located at the junction of two great trunk highways, and Alabama will profit because of the construction of these transcontinental roads, according to a statement of John Craft, of Mobile, president of Alabama Good Roads Association. Mr. Craft says that at a recent meeting of the Spanish Trail Highway Association held in Mobile there were delegates from every state that borders on the Gulf of Mexico.

"The Spanish Trail Highway will run from the Atlantic to the Pacific Coast. The Jackson Highway will run from Chicago to New Orleans. It is probable that both will run by way of Mobile," said Mr. Craft.

Preparations are being made by the Spanish Trail Association to affiliate with the associations that form the National Highways Association. At the meeting in Mobile there were present many of the leading citizens of the Gulf Coast, including General Coleman Dupont, Charles Henry Davis and Frederick Ramsen Hutton.

"The Spanish Trail will run from Jacksonville, Tampa and Miami to San Diego, Cal., by way of Mobile and New Orleans. Tentative plans to work with the Jackson Highway Association to build the link between Mobile and New Orleans are being made," said Captain Craft.

That the Jackson Highway in Alabama will be improved within the next ten months, and that this highway Association to build the link between Mobile and New Orleans are being made.

That the Jackson Highway in Alabama will be improved within the next ten months, and that this highway should by all means be routed through Alabama, is the contention of the good roads. While in Birmingham Captain Craft attended the meeting of the Jackson Highway Association.

Farmers who do not want to take their wives and families over bumpy roads and make them disgusted every time they go to church or town, should drag the roads and see to it that, they freeze up as smooth as possible this winter.

Rogers county, Okla., has voted \$238,000 for improvement of its public highways in several districts.

### Cook County, Ill., Commissioners Inspect State-Aid Roads.

On November 26, the Board of County Commissioners were the guests of the Associated Roads Organizations of Chicago and Cook county on the first annual inspection of state-aid roads laid in Cook county, Ill. The trip covered 100 miles of good and bad roads entirely within the limits of Cook county, except one short excursion into DuPage county to see the concrete pavement laid by the DuPage County Board on Wheaton Road, an extension of the Twelfth street concrete road of Cook county. In several towns along the way the citizens extended enthusiastic receptions to the County Board, and the good roads sentiment in Cook county sustained a remarkable impetus.

The trip was so arranged as to cover typical improved highways as well as some of the unimproved roads. The rainy weather which prevailed, served to call forcibly to the attention of the commissioners the contrast between muddy, unimproved highways and the concrete roads built by state aid.

Under the law as originally framed, the county was not permitted to build roads within village limits. The error of this was excellently shown on the Twelfth street road, where alternate good and bad stretches were encountered. The good stretches were those built under state-aid and the bad spots were unimproved stretches on the same road within village limits. There was a sigh of relief each time a good road was reached. By an amendment to the Tice Law of Illinois, the county is now empowered to pave the bad stretches through villages with a population of 20,000 or less.

Citizens of Riverdale, Harvey, Blue Island, Lyons, and Riverside met the County Board to express to them their appreciation of the work done in Cook county and to bring to their attention the necessity for additional improvements on other main-traveled highways. These receptions showed the desire of the several villages that the highways connecting them with Chicago be improved.

The seven-mile stretch of concrete road on Milwaukee avenue, one of the principal thoroughfares leading to Chicago and used largely by automobilists and truck farmers, was included in the trip. This is the longest continuous stretch of concrete highway in Illinois.

The Associated Roads Organizations acted as host at a luncheon served at the Chateau Des Plaines in Lyons, at a reception at the "House that Jack Built" on the Milwaukee Avenue concrete road, and at a dinner at the Sherman House, following the trip.

President Reinberg and the other members of the County Board, expressed themselves as greatly pleased with what they had seen, and extended their hearty co-operation to the citizens of the county in continuing the good work already done to pull Cook county out of the mud.

### Repair a Road With the Same Material of Which it is Made.

Road repairing is worth considering in a broader way than has been done in the past. In some sections the work of construction is almost complete and now attention must be directed to road repair and maintenance. It is useless to build any kind of a road and then neglect it. Repair work should be started the day construction is completed. If this is done there is not much danger of the roads becoming bad. Neither will its usefulness be impaired by the actions of time and usage. A good road out of any material will need

some attention to keep the water off of it. Ditches and culverts must be kept clean, shoulders kept up and weeds from the roadside.

Earth, macadam, bituminous, and other kinds of roads must be kept smooth. On the earth road there will appear ruts and mudholes unless there is a vigilant maintenance man on the job all the time. When a mudhole appears it should be cleaned out and drained, then be filled with good clean earth free from any vegetable matter. This should be tamped solid. The road should be dragged every time that ruts appear on the surface. In winter season it should be dragged to clean the road bed of slush. This should be done with a lap-plank drag then after the surface drains and dries sufficiently it should be dragged with a heavier drag to fill up all ruts and make firm the surface. This dragging should be done at the time that the earth will crumble. It is a waste of time to drag a road when it is dry.

Rocks should never be put into a mudhole unless they are broken and covered with good earth. Creek gravel in which there is sand can be used but in most cases the best results can be had from the money and time expended by just using the plain earth found on the side of the road and the extra cost that it would take to get other material, saved to be applied at some other point. What has been said of earth road can also be said of macadam road. It should be repaired with the kind of stone that the original roadbed is made from and in the same manner that the original was constructed. A water-bound macadam should be repaired by the water-bound method. The hole or rut should be cleaned out and fresh stone of similar size and kind of that already in the road should be placed and tamped into the hole. This should be watered and tamped firm, but under no circumstance should tar, asphalt, or any bituminous binder be placed upon the newly applied stone, because this will cause the formation of a hard mass different from the roadbed and will start wearing on each side. Instead of one hole or rut there will be a hole, a bump and another hole. This condition can be found in the road leading out of Bluefield to Princeton and emphasizes the necessity for the precaution herein suggested. Information on repair and maintenance of public roads is furnished free from the West Virginia State Road Bureau to any person who asks for it.

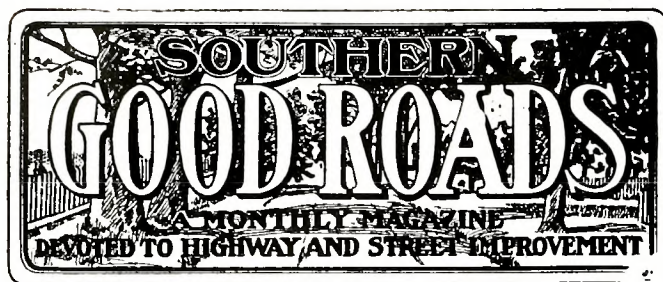
Stress will be laid upon the subject of maintenance and repair at the Road School given by the University of West Virginia January 11 to 21, at inclusive. This course is free to any citizen. County engineers are required to attend and county courts, road supervisors, and contractors will be benefitted by attending.

### Good Highway Workers Used.

Highway markers similar to street signs will be installed soon at the intersections of the principal roads of St. Joseph county, Indiana. There will be 42 signs, displaying the name of the road, and the distance to South Bend and the nearest towns of the county. The markers will cost about \$395.

The appropriation for the road signs was made at the last session of the county council after the agitation favoring the manner of marking the roads, by the Northern Indiana Automobile association and various community centers.

Guilford county, N. C., has completed the placing of asphalt surface on a portion of the concrete road to connect that city with High Point.



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**ALL INTERESTS SHOULD UNITE.**

There is an effort now on foot to unite all national good roads bodies into one compact organization that will be able to work with redoubled power for the cause. The effort should meet with encouragement on the part of all fair-thinking apostles of good roads everywhere in the nation. This does not mean that there should not be separate bodies, formed for the sake of territorial convenience, but where there are a number of bodies with national scope having separate meetings on different dates dissensions are liable to arise.

Even should dissensions be avoided, the sake of convenience calls for one national congress of men who are interested in solving this big share of the nation's constructive program. It is a matter of considerable expense for many of the men who attend these bodies, and many of them devote considerable valuable time for the sake of getting together with other men who are working for the same thing in another section of the country. The firms who make all kinds of road building machinery should be given an opportunity to display their wares for the builders of good roads in the most convenient manner. From this exposition comes many good ideas, and the way to get the highest efficiency many times depends on seeing competitive tests.

It is to be hoped that the appeal of the American As-

sociation of State Highway Officials for an amalgamation of the efforts of the National Road Builders and the American Highways Association will meet with a hearty response. It would be unwise to pass by an opportunity for constructive, effective work merely to gratify some personal whim.

**JUSTICE TO TEXAS.**

Among the states of the South that are turning with might and main to the construction of modern highways the name of Texas is far from the bottom. The work is now getting into full swing and bids fair never to stop until this great empire, for it is an empire, is knitted together with fine roads along its many thousands of miles of highways. The following letter to the editor of Good Roads from Secretary D. E. Colp, of the Texas Good Roads Association, San Antonio, tells much of the aims and accomplishments of construction in that state:

"I am just in receipt of the December number of your publication and I believe it is the most interesting number that I have had the pleasure of reading in quite a while. You have practically covered the activities along the good roads lines all over the United States, and the write-ups are unusually interesting. Somehow it, just seems to be better gotten up than usual, but there is one correction I would like to suggest, and that is in the good roads notes on page 19 next to the last paragraph in the Iowa article—referring more particularly to the last lines—which says "Texas with her immense territory spent \$8,750,000." Of course, this means in 1914 for the improvement of her roads. These figures are exactly correct as to the amount of bonds voted for the improvement of our highways, but this state levies and collects in all counties a 15 cent tax annually for the improvement of her roads and bridges, and in addition to this a number of counties a few years ago voted a 15 cent special tax, making 30 cents taxation for those particular counties, but this method has been found to be bad and there is being very few counties voting such tax the last two years, but instead they are voting bond issues or issuing county warrants, which is a direct obligation against the entire county. The total expenditure for the improvement of roads and bridges in Texas in 1914, including the \$8,750,000 bond issues, the regular and special tax of 15 cents and county warrants amounted to \$14,137,000. The report for 1915 will be available in about thirty days, as yet we have not a complete report in, but just as fast as we get them in we are tabulating them and will be in position to render a report the latter part of January, whether we have it complete or not. I am not in position to criticize the Iowa statement, but I am under the impression that New York spent a great deal more money in 1914 than either Iowa or Texas or any other state in the Union, but I haven't the time to look up statistics today and will merely leave this to you if you wish to make any further corrections.

"The road work is progressing to our entire satisfaction in this state and we expect to take first place in the mileage of improved roads by December 1916. I am herewith enclosing you circular letter and some newspaper articles that we have just sent out on the Meridian Road. In case you wish to write a story from it we will appreciate whatever you see fit to write.

There is a movement on foot to complete a winter tourist route from Washington to California along the Gulf Coast via Houston and San Antonio, and as soon as these plans are a little more matured we are going to ask your co-operation to help make this the success it deserves.

"Assuring you that we appreciate the great work that you are doing through your Good Roads Magazine, and wishing you a merry Christmas and a happy new year, I beg to remain,

Yours truly,"

#### Maintenance of Roads.

The maintenance of our public roads is not only a serious question in North Carolina but other states are confronted with the same problem and are trying to solve it. In West Virginia, lumber wagons have been doing a great deal of damage to the public roads and the county engineers are now putting in force an act recently passed at the extraordinary session of the last legislature, which is as follows:

"Section 8, Chapter 8, of the Acts of the legislature of this state, enacted in the second extraordinary session of 1915: Where it is required that persons, firms, etc., making continuous use of any piece of the county road, or driving there any wagon, etc., and by such use are causing more than the usual wear, such persons, etc., may be compelled to put thereon a section man or men and keep or assist in keeping said road in such repair as the court may order.

"Any person disobeying or refusing such orders shall be adjudged guilty of a misdemeanor, and upon conviction thereof fined not to exceed \$50, or imprisonment, or both."

This action of the West Virginia legislature is a move in the right direction, but I am still of the opinion that the "Wheel Tax" method of furnishing a maintenance fund and of controlling the damage that vehicles do to roads, is by far the more practical and effective one.

We tax all the people of the counties for the construction of roads but it is the users of the road that should pay the greater part of the cost of the maintenance of these roads and this will be accomplished by the "Wheel Tax," all revenue therefrom being used for road maintenance and for no other purpose.

Vehicles will pay a "Wheel Tax" according to the amount of damage that said vehicle can do to the road. Thus a wagon capable of carrying 4000 pounds and with wheels having tires 2 to 2½ in. in width would pay a much greater tax than the same capacity wagon wheels have tires 6 in. wide. Then again, if the front wheel of such a wagon did not have the same tread as the rear wheels, the tax would be still lower. The heavier the load the wagon will hold, the higher, proportionately, will be the "Wheel Tax," and the wider the tire, the "Wheel Tax" will be proportionately lower. With automobiles the horsepower and weight of machine will determine the wheel tax.

An equitable scale of the "Wheel Tax" can be devised which will not work a hardship on any one and the revenue derived from it will maintain the roads.

JOSEPH HYDE PRATT,

Secretary State Highway Commission.

#### George Fitch on Roads.

Recently Mr. Fitch delivered himself of a good roads article that is unusually felicitous. For instance, Mr. Fitch said that "a good road is a road which has only

two dimensions, length and breadth, while a bad road has three, length, breadth and thickness or depth."

Following are some of Mr. Fitch's observations:

"A good road is merely a roof over a bad road. When an enterprising state has decided to pull itself out of the mud it roofs over mud roads with tar and gravel and macadam, and the farmers come to town in wet weather just as carelessly as they did when Noah went in the Ark and didn't care how much it rained.

"Good roads are useful because they enable the farmer to market his hogs when they are ripe instead of when the roads are navigable by a wagon which isn't fitted with bilge keels and propellers. But they are also useful because they enable the tired man to climb into a nervous automobile and commune with nature far, far away from cabarets and pictures of September Morn.

"Some farmers speak of good roads with scorn for this reason and insist that they do not want the city man ambling past their farms at the rate of 60 miles an hour. This is short-sighted. After the city man has worn long, hot holes in the country atmosphere for a few years he knows enough about it to buy a farm and settle down when he has worn out. And this enables the farmer to sell the said farm and come to the city.

"This world is full of give and take, and the farmer who does not give the city man a chance to breathe country air flavored with real estate will never have a chance to take \$300 per acre from him for a nicely equipped farm with all the modern improvements, including a 1916 almanac."

#### Trade Follows Good Roads.

Never before have Fremont, Ohio, merchants realized the important effect of good roads on business.

Demand for all commodities has been urgent and merchants say that the late afternoon and evening business has been astonishing. The big influx of buyers in Fremont stores is attributed more than anything to the fact that the roads have been goods. One druggist said that 40 per cent of his business has been coming after 5 p. m.

Many of the new customers have come to the city in automobiles.

"I can see no better course for the chamber of commerce to follow than to boost for good roads leading into the city from the country" said a business man.

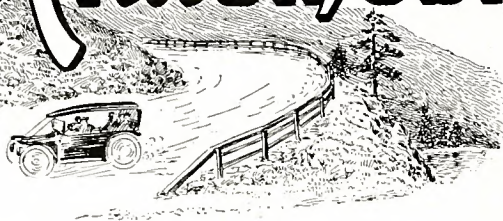
"All the important thoroughfares leading into the city should be improved and the city should see to it that the city roads leading to the important highways are paved. The trade follows the course of good roads."

#### Virginia Road Men Meet.

Reports received at the headquarters of the State Highway Commission and responses from many counties and cities to the invitation extended to Mayors and boards of supervisors indicate an attendance of about 1,000 at the session of the annual convention of the Virginia Road Builders' Association to be held in Richmond, January 18 and 19.

Assistant Highway Commissioner C. B. Scott has almost completed the program for the convention. A few of the speakers invited from other states are yet to be heard from, but the tentative program makes an interesting showing. Many of the speakers are recognized experts on the respective subjects which they will discuss.

# The Automobile in the South



## SOUTHERN TOURING ENTERS NEW ERA.

**R**APIDLY improving roads and the compilation of accurate running directions on principal routes will greatly facilitate motor travel in Dixie during the coming year.

Automobile touring is making rapid strides in popularity and interest through every one of the southern states. This is due largely to the many local or district highway improvements in more or less constant progress within the territory below the Potomac and Ohio rivers, aided very materially by the various through routes between the northern and central-western states and the South, which are being developed, marked and brought to the attention of thousands of motorists planning the longer trips. While there are some temporary drawbacks, such as the long delay in completing the highway between Washington, D. C., and Richmond, Va., and the meagre ferry service over the streams along the Gulf Coast, the south as a whole is putting through a road-building program unsurpassed by that of any equal area in the United States.

As a result, the time formerly taken for a tour, say from New York or Chicago to Atlanta, Florida or New Orleans, has been at least cut in two within the past few years, while facilities for the convenience and comfort of the tourist have been multiplied. Optional routes have been opened up in surprising numbers, some skirting the Atlantic Coast as closely as the nature of the country will permit, others crossing the ranges and threading the valleys of the Appalachian Mountains, and still others following the comparative levels of the Mississippi River valley. So wide is the choice of routes across this large territory that the tourist may go one way and return the other for two or three successive seasons without exhausting them.

Now for the first time, also, the main roads of the southeastern states have been logged on the same thorough plan as those of the North have been for several years past; and about January 15th, they will be brought out in a new volume of the Automobile Blue Book—the sixth in a series which now covers the entire country. Since midsummer the experienced field forces of the publishers have been running constantly over the most important routes in Virginia, West Virginia, North and South Carolina, Georgia, Alabama, Mississippi and Louisiana, taking complete notes and odometer mileages as the basis for text directions and outline maps, uniform with those of the older volumes. Similar work is now under way in Florida, that state having been taken up last to secure the benefit of the latest data on new construction, especially brick pavement being laid on several of its most important routes, both along the famous East Coast and in the interior.

Georgia, the "Empire State of the South," has the best average roads in the southeast; some of them are

exceedingly good, and excellent time can be made over them in almost any direction. North Carolina, where sand-clay construction predominates, is making fine progress with its road work; and the same applies almost equally to South Carolina. Aside from the famous Shenandoah Valley, the north-and-south routes across Virginia are yet somewhat disappointing, especially those near the coast; but they are still better on an average than they were a few years ago, and present no serious inconvenience or difficulty, except perhaps some clay stretches in wet weather.

Florida is now fully alive to the necessity of providing better roads for its ever-increasing number of fall and winter visitors; and the various counties are spending about five million dollars for that purpose. Brick seems to be the most satisfactory material, superceding mile after mile of sand, muck and even bog. Being practically without grades, highway construction in Florida is relatively cheap, and progress throughout the state should be much more rapid in the future than in the past.

Perhaps the most backward important line in Florida is that from the lower border of Georgia near Valdosta to Madison, Live Oak, Lake City and into Jacksonville from the West, but the authorities have been stirred up, and the road should receive much benefit from being a part of the "Dixie Highway." By way of contrast, that part of the coast route from Jacksonville through Brunswick, Ga., has been so greatly improved that old-time tourists who remember the former one, with the bothersome ferry at Darien and the several miles of soggy road along the dikes through the rice fields, would hardly recognize it today. The trip from Valdosta, Florida, to Pensacola, the state capital, is fine except for the relatively few miles from Milton to Pensacola, at least part of which will soon be put in better shape.

## New Orleans Routes Made Easy.

There are now two good ways from Virginia points to New Orleans, the approved routes being substantially as follows: (1) Staunton, Natural Bridge, Lynchburg, Greensboro, Charlotte, Greenville, Athens, Atlanta, Montgomery, Meriden, Jackson, Baton Rouge, New Orleans; and (2) Richmond, Petersburg, Oxford, Durham, Pinehurst, Cheraw, Columbus, Augusta, Thomason, Macon, Oglethorpe, Albany, Thomasville, Bainbridge, Pensacola, Mobile, New Orleans. There are less than 100 miles of poor going on either of these routes, and most of it is fine.

The roads along the Gulf Coast from Pensacola, Fla., to New Orleans will be found good about ninety per cent of the way; and the scenery is among the most interesting in the entire south. From Pensacola to Staunton is fine except for the first few miles out of Pensacola; and the principal drawback to the longer portion from Mobile to New Orleans is the slow and infrequent service at the several ferries, particularly the one from Mandeville over Lake Pontchartrain to Crescent City, which crosses but once a day.

These facilities will, of course, be increased with the further development of motor touring. The Gulf Coast

resorts and watering places, such as Biloxi, Gulfport and Pass Christian, welcome the motoring visitor from the North with true southern hospitality.

Considerable progress is being made from New Orleans north on the lower part of the important trunk line toward Memphis and Nashville. From the Crescent City to Baton Rouge is good; and thence to Jackson, Mississippi, is a fair road, constantly being improved. A new highway is being built from Jackson to Meridian, Mississippi, which will be ready in the spring. This through connection to the north from New Orleans is second in importance only to the one from Mobile and the Gulf Coast resorts.

#### **Odds and Ends About Southern Roads.**

In interior Alabama—Montgomery to Atlanta and Montgomery to Birmingham, all good; Birmingham to Atlanta, via Rome, and Birmingham to Chattanooga via Rome, good. More complete reports on Alabama will be available later.

South Carolina is building a state road from Columbia to Charleston via St. Matthews and Holly Hill; and another state road from Charleston to Augusta via Summerville, Blackville and Aiken. Both Blue Book routes from Atlanta to Chattanooga are good.

The unimproved, and very bad portion of the road from Washington Fredericksburg, on the way to Richmond, has now been reduced to about fifteen miles; but there is little hope for the completion of that stretch for the 1916 touring season.

There is fair prospect of a connection from Knoxville, Tenn., to Barboursville, Ky., and thence to Danville and Richmond, Ky., this road would be of supreme importance and a much-traveled connection between central and eastern Kentucky and Florida points.

Additional investigations are being made of the highway from Roanoke to Bristol, Knoxville and Chattanooga, and also from Louisville to Knoxville, Nashville, and Birmingham, as well as from St. Louis and Memphis to Jacksonville. The Blue Book car making routes in the middle western territory has been co-operating with the field forces in the south to the extent of running over the intervolum territory between Louisville, Nashville and Memphis.

The routes of the southern states will now average about as good as those of New England and New York State at the time road work was begun in those sections about fifteen years ago; and the possibilities of touring below the Mason-Dixon Line bid fair to show a nearly-equal, if not a fully-equal development.

#### **Road Mirrors at Bad Turns.**

McPhee & McGinnity have donated to the city of Denver two plate glass road mirrors which will be placed at the first bad turn on the Bear creek road so that motorists driving in either direction will be able to see cars approaching the turn from the other direction.

The mirrors should entirely obviate the danger of collisions at the turn. They enable drivers to see for a considerable distance cars which are approaching the turn and which, if it were not for the mirrors, could not be seen.

The turn where they will be installed is dangerous, but, after the mirrors are installed, there should be small possibility for collisions there. Road mirrors are being successfully used at many places where bad curves contribute to the danger of collisions.

The city of Charlotte, N. C., has begun the construction of 17,500 yards of concrete sidewalk.

#### **Kentucky Prisoners on Roads.**

The voters of Kentucky in the recent election carried by a tremendous majority the constitutional amendment permitting state prisoners to work outside the prison walls.

Since 1891 Kentucky statutes have forbidden the taking of prisoners outside the prison walls, the law having resulted from abuses which followed their employment by railroads and other private corporations. Two years ago an amendment to remove this ban was carried by a large majority but declared unconstitutional, as Secretary of State failed to advertise it for a sufficient period of time. The supporters of the amendment saw to it that no error occurred this year and there will be no question as to the constitutionality of this amendment. The majority in its favor was much greater than two years ago.

The successful passage of this amendment is largely due to the enthusiastic efforts of Col. R. J. McBryde, editor of the Louisville Times, and Miss Linda Neville, the Kentucky representative of the National Committee on Prisons and Prison Labor.

Col. McBryde, speaking at the Kentucky Conference of Charities and Corrections, told of the difficulty experienced in bringing the Kentucky prisons to their present standards, which, though faulty, are an immense improvement over the prisons of former years. Lobbyists had to be fought, he stated, and a board of prison commissioners which controlled the legislature had to be overthrown to secure the needed reforms. Even yet the prison board is a partisan affair, but, taking its handicaps into consideration, it has done wonderful work, aided by wardens Wells and Chilton, two of the best known prison officials in the state.

The amendment will permit Kentucky prisoners to be worked on the public roads. Bills to provide for this road work will be introduced into the coming session of the legislature. The National Committee on Prisons and Prison Labor has offered to assist in drafting these bills and to secure the co-operation of the Graduate Department of Highway Engineering and the Bills Drafting Bureau at Columbia University.

The development of the convict road work will have the enthusiastic support of R. C. Terrell, the State Commissioner of Roads, who strongly favored the amendment, bringing before the people of the state the success of other states with convict road work.

Kentucky badly needs roads and also better employment for her prisoners, at present leased to prison contractors at 75 cents per day. The first step has been taken in the passage of the amendment, and the National Committee on Prisons and Prison Labor hopes by this time next year to see Kentucky prisoners building roads and the roads rebuilding the prisoners.

Bad roads and idle farms. Bad roads and poor churches. Bad roads and poor schools. Bad roads and no social life. Bad roads and discontentment. Bad roads and high cost of living. Good roads and fertile farms. Good roads and good church attendance. Good roads and good school attendance. Good roads and good social enjoyment. Good roads and contentment. Good roads and better living at less expense. Give us good roads! Good roads! Good roads! And more good roads!!!

Baltimore is planning to spend a million dollars toward providing smooth streets in that city during this year.

### \$25,000,000 in Federal Aid.

Announcement has been made of the detailed plan for Federal aid in highway improvement, which is to be presented to the Congress. The plan calls for an annual federal appropriation of \$25,000,000 to be distributed as provided in the bill drawn by the American Association of State Highway Officials.

Canvasses that have been made indicate that the measure will have the support of practically all agencies that are working for better roads and for aid from the federal government. Although President Woodrow Wilson has made no expression upon the subject there is a conviction, based on substantial evidence, that he has seen the plan of the association and that it meets with his approval. On the committee which drafted the measure is E. A. Stevens, state highway commissioner of New Jersey, who was named while Wilson was Governor of New Jersey, and who is a close friend of the President. Colonel Stevens was unwilling to pass upon the proposed bill finally until the President's views had been obtained. The fact that he now approves it is not without its significance, although this is not accepted as giving any assurance that the President is favorable to so large an appropriation as \$25,000,000. The thing desired above all else is the establishment of a definite policy with respect to federal aid. In the past the Congress has hesitated about advancing money to the states. A few years ago \$500,000 was appropriated for one year.

The time is now believed to be at hand for a really constructive program. The state officials who are supporting the program recall that the big system of rural free delivery of mails, which now reaches all parts of the United States, was begun with an appropriation of \$10,000. Almost from its inception it grew by leaps and bounds. The federal aid plan, which is closely related to post roads and military roads, is expected to have a similar history. The measure is the work of a committee composed of George P. Coleman, highway commissioner of Virginia, chairman; W. D. Sohler, Massachusetts commissioner; Thomas H. MacDonald, Iowa commissioner; E. A. Stevens, New Jersey commissioner; Lomor Cobb, Arizona commissioner; Joseph Hyde Pratt, North Carolina commissioner, and Henry G. Shirley, Maryland commissioner.

The bill is remarkably simple, and the new governmental machinery created is small. The distribution of the funds to the states is left to the Secretary of Agriculture, under provisions of the measure, working with the office of public roads. The expressed object of the bill is to promote the improvement of rural post roads, military roads and roads used for interstate commerce.

### The Main Roads Come First.

That all the roads of a state cannot be improved simultaneously and that the most used arteries of communication command priority, is again exemplified in Missouri, where at Sedalia the Permanent Road Improvement Association was recently organized. Thirty cities of the state, including St. Louis and Kansas City, were represented in the meeting, the key-note of which was the great value to the commonwealth of connecting its centers of population and at the same time providing for ultimate attention to the feeder roads which will fit into the most important highways. The Permanent Road Improvement Association believes that there should be a logical federal co-operation with the several states, with federal money utilized

with state money in the building of the post roads which must accept the greatest burden of traffic.

Representative William P. Borland of Kansas City, who has been a persistent Federal Aid advocate ever since he entered Congress, makes this concise comment on roads development in Missouri, believing that it will serve as an example for other middle western states such as Kansas, Nebraska and Iowa, with similar conditions to be answered in many southern states:

"Missouri has caught step with the procession. Business men in all of our smaller towns and cities are interested and are working for long roads, through roads, connecting roads, cross state roads, trancontinental roads, road systems, permanent roads, 365-days-in-the-year roads—anything but wasting money in politics or pork, or the temporary upkeep of unimproved roads.

"Owing to our central position we feel that all roads lead, or ought to lead, to Missouri, and hence, if we can't be on the main line of the Lincoln Highway, we can encourage the National Old Trails. Hence I have re-introduced my Old Trails bill in Congress.

"Good roads help small towns and they are the only phase of modern life that have that effect. Railroads and most other modern inventions kill the small town and build up the great cities, but all-the-year-round roads turn the stream of wealth, travel, and business back towards the rural centers. Consequently our business men all belong to some one of the numerous road associations."

Chairman George C. Diehl of A. A. A. National Good Roads Board thus comments on the enlarging viewpoint:

"The organized motorists of the country have contended, in season and out of season, that the centers of population in a state are as much in need of road connections with one another as that attention should be given the important matter of transporting farm products to the nearest market place. Indicating the growth of the National viewpoint, Maine has planned a state road system of some 1,300 miles, which is only 5 per cent of the total mileage but which will serve 73 per cent of the total population.

"California's two main artery roads, from the Oregon line to the Mexican border, and the persistency of Washington and Oregon in providing for trunk line routes, indicate the belief of the Pacific slope in roads which not only serve the locality through which they pass but which can answer the greatest needs of the several states.

"I am not an alarmist, but through road connections must be considered as a reasonable precaution when we study what is happening in Europe. The day when fixed lines of steel answer all transportation necessities has plainly passed.

Good roads are a benefit to any and every community. They help the school, the church, the Sunday school, the farm, the liveryman, the doctor, the traveling salesman, the wholesaler, the teacher, the preacher, and even the undertaker can get to the cemetery easier and better if he has a good road.

Too many roads have been built "as father did" and stand today as monuments of ignorance and folly or have been swallowed up by the mud and water.

The man on the farm needs a good, firm, well-drained road that he can use at any and all seasons of the year.

### Incorporate Jackson Highway.

The officers of the Jackson Military Highway Association have inaugurated plans for incorporating the association and the papers are now being executed and after having been published as required by law will be filed with the attorney-general for approval. After the approval by the State authorities a charter will be granted the association.

The corporation will have no capital stock and its purpose as enumerated in the application for charter "to select and establish the route for a continuous public highway to be known and designated as 'The Jackson Military Highway' from the city of Nashville in the State of Tennessee to the city of New Orleans in the state of Louisiana, to pass through the counties of Davidson, Williamson, Maury and Lawrence in the state of Tennessee, the counties of Lauderdale, Colbert, Franklin, Marion and Lamar in the State of Alabama, the counties of Lowndes, Noxubee, Kemper, Lauderdale, Clark, Jasper, Forest, Jones, Lamar, Pearl River and Hancock in the state of Mississippi, and certain parishes in Louisiana; and to encourage and promote the construction of a permanent public highway on and along the said route selected and establish and to encourage and promote the proper maintenance thereof, etc."

The names of the incorporators are Messrs. R. T. Simpson and J. M. McBeath, of Meridian, and Mr. W. H. Carter and Mr. Thos. Thos. J. Locke, Jr., of this city.

The purpose of the incorporation is to perfect an organization in a legal way in order to adequately manage the affairs and interests of the proposed route.

### Reckless Driving Fatal.

There were fifteen fatal accidents on Iowa roads during the period from Oct. 25 to Nov. 23, according to the highway commission. Eleven persons met death in automobile accidents, one person was crushed when a wagon on which he was riding upset, and three were killed by engines going through bridges. The fatal accidents follow:

Oct. 25—Ansel Eskew of Riverton, car over embankment.

Oct. 26—Walter Roebik of Ida Grove, car turned turtle.

Oct. 28—Miss Irma Phillips of Angona, car turned turtle near Ledyard.

Oct. 29—Carl Doermann, of Hartley, car missed bridge.

Nov. 1—Ansberry of, Guthrie Center, car skidded through bridge railing.

Nov. 1—Oscar Addy, of Cleghorn, struck by long rod on hayrack he was passing.

Nov. 3—Mrs. Albert Winters, of Humboldt, car ran off temporary bridge.

Nov. 3—Mrs. McCallab, of West Liberty, victim learning to drive car.

Nov. 3—Carroll Martin, of Afton, wagon upset.

Nov. 4—Leo Bohounek, of Chelses, no lights, car in ditch.

Nov. 16—Edward Mitchell, of Marengo, car plunged off bridge.

Nov. 23—Mrs. Roy Hoskins, of Harlan, driver blinded by glaring headlights of approaching car.

Oct. 28—John Lund, engineer; Nelson Canady; Edwin Canady, aged 8, all of Creston, tractor plunged through small culvert.

### Convicts on Colorado Roads.

One thousand miles of perfect roadway have been constructed by Colorado convicts in the past seven years. Colorado began to employ convicts on the roads in 1908. At first armed guards were used, but during the second summer the honor system was introduced, and it is still in vogue.

Warden Tynan states that the convicts are working on five separate and distinct roads, and will remain at work all winter, as in Colorado they can operate the camps during the whole twelve months of the year.

"One of the most wonderful roads ever constructed in America has just been completed," Warden Tynan says, "after two years of blasting solid granite for eighteen miles along the Arkansas river. This opens up a splendid automobile highway from Kansas, up the Arkansas river to its source, over the 'Continental Divide' and to the Utah line.

"We have still another gang of men working in the Eagle River canon on this same route, and they have four years work ahead of them. We are operating large power drills and steam shovels in our mountain work and heavy gasoline tractors and other machinery in our prairie camps."

Colorado convicts, in addition to the work, form three large ranches, and next year a fourth ranch is to be added. From 50 to 60 per cent of the able bodied prisoners are employed out of doors, and Warden Tynan sets forth that the success with them is better than ever.

### Road Organization.

The question of road improvement calls for organization. Organization that will produce efficiency can be had and should be had in every county. The work should be under one head and that person should know daily what is being done, how much is being expended, where the work is being executed, the number of laborers and teams employed and the amount and kind of material used as well as the cost of each.

It is one thing to get an accounting for funds expended and another to get the maximum results which should be the aim of every person interested in the betterment of the roads of the state. The Ohio County, W. Va., Road Department is very efficient and the results in that county show the value of such movement. Every morning a report from each person having anything to do with any road work in the county is placed in the hands of the Board of Commissioners. A tabulated list of the amount expended and the balance in each fund is kept before the commissioners. Each member of the Board has in his pocket a statement showing the condition of every fund in the entire county and the amount appropriated to each piece of work. McDowell county has a good organization; and a few other counties have placed their road work under modern business systems. Under a new law, of West Virginia, officials that are following the old haphazard way of giving orders and letting the road business of the county drift, are taking a very great risk. All road officials should read that Act and get Bulletin 17, of the State Road Bureau, which prescribes forms for a road system.

The Ohio registrar of vehicles has filed a report covering the past year from January 1 to October 15, showing the financial side of the business. The total expense of conducting the office amounted to \$120,750. The receipts are each day turned over to the State Auditor's office.

### Virginia Good Roads Day.

Governor H. C. Stuart, of Virginia, has issued the following proclamation.

"Believing, as I do, in education of our young people in the practical affairs of life and in the problems that will surely face them as citizens, I deem it timely to have one day in the school year observed as good roads day, when special programs may be carried out and when students may be encouraged to consult with each other as to the fundamental facts concerning the building and maintenance of the public highways and the advantages derivable therefrom.

"Now, therefore, I, H. C. Stuart, governor of Virginia, do proclaim Friday, January 28, 1916, good roads day, and request that it be duly observed in the public schools of the Commonwealth.

"Given under my hand and under the lesser seal of the Commonwealth, at Richmond, this the twenty-third day of December, in the year of our Lord one thousand nine hundred and fifteen, and of the Commonwealth the one hundred and fortieth.

"H. C. STUART, Governor."

### Where the Farmer Loses.

There are 6,500,000 farmers in the United States, most of whom raise something for market. They have been described by Dr. T. N. Carver, Harvard university expert in economics, who was engaged last year by the department of agriculture to draw plans for the organization of a rural community, as "temperamentally an independent, headstrong, individualistic class, and therefore difficult to organize."

That they are "difficult to organize" is demonstrated by the unimproved public roads in the United States

over which they must haul their products to market at a loss of approximately \$300,000,000 every year, or about the total assessed value of property, real and personal, in South Carolina.

That they are "independent" of good roads to their own great loss is evidenced by the enormous waste of both money and muscle in trying to do business without good roads and their apparent lack of interest in compelling their representatives in legislatures and congress to provide highways for their service.

### Another Mountain Highway.

Dr. Lucius B. Morse, one of Hendersonville's most enthusiastic good road promoters, has dreamed of what would be another important highway to Hendersonville, N. C. In pointing out the advantages of this in its location on such important highways as that from Asheville to Spartanburg, Asheville to Greenville, from Hendersonville to Bat Cave, where the road intercepts the Asheville-Charlotte highway, he sees the need of a highway to Atlanta and shows whereby such a route could be made at little cost. His plan is to intercept the Asheville-Atlanta highway in Macon county. Dr. Morse maps the route via Brevard, Lake Toxaway, Lake Sapphire, Lake Fairfield, Cashiers Valley and Highlands, intercepting the main highway just beyond Highlands. The road has been completed from Hendersonville to Brevard. From that point to Toxaway a portion of the road is in good condition and there is a movement for improvement all along the line. He is agitating a movement to make the improvements in such a manner as to make the linking-up or coupling process a matter of small cost.

### A LESSON FROM QUEBEC.

Some surprising reports of progress were made at the International Road Congress, held at Worcester, Mass., recently. Perhaps the most notable came from Province of Quebec, Canada. Five years ago there were practically no macadam or gravelled roads in that province. Today it has 1,200 miles macadam, 500 of gravelled roads, 10,000 new concrete bridges and culverts, and 250 macadam plants pushing new work.

When you consider that Quebec is a country of scattered people, few cities of any size, and total population of only 2,000,000 this advance seems remarkable. How many of our states are doing as well, in proportion to population or wealth? Quebec will soon place its cattle, oats, hay and apples on the market at lower rates, and be a still more formidable competitor.

Every state in the union should take note of these developments elsewhere, and ask if it is keeping up with the procession. The cost of living is needlessly high because of the cost of getting food to the markets. Manufactured products, loaded from factory to a railroad sidetrack, have not risen much. It is the food products, drawn over poor roads in small loads that cost high.

Florida will spend over two and half million dollars on the Dixie Highway alone during 1916.



**A**

## Happy Introduction

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## GOOD ROADS NOTES IN BRIEF

Reports from seven Mississippi counties indicate that the work on the Jackson Military Highway in that state will be complete by June 1.

Georgia now has 13,500 miles of surfaced roads and 38,628 miles of other roads that are adaptable to bad weather. Her total mileage is within a few miles of 100,000.

279 miles out of a total of 508 of highways in Pulaski county, Ark., are now listed as improved roads.

Polk county, Ill., will add to its road building equipment another Twin city traction engine, two Adams graders and a White motor truck.

The meeting of the Kentucky Good Roads Association, held in Louisville last month, pledged itself to stand by the state aid law that has proven so beneficial. Robert J. McBryde, Jr., presided.

Mr. J. Sheppard Potts, of Richmond, Va. president of the Rural Improvement League, is working up sentiment for the building of a road 350 miles long from Old Point Comfort to White Sulphur.

Monroe county, Ala., has just awarded the contract for the building of a 60-mile road that will be tendered as a part of the Jackson highway. Other adjoining Alabama counties are also in the race and are building some fine highways.

Vermillion county, Illinois, road supervisors expect to have everything in readiness to begin the construction of the \$1,500,000 road system for the county by May 1.

The national hoboes' association passed "ringing" resolutions declaring they are "agin" good roads and the vagrancy laws. There is a sneaking feeling that if were not for the vagrancy laws they would be for good roads.

Twenty counties of Illinois propose voting bonds to the amount of twenty-five million dollars for immediate road work.

Several Arkansas counties have issued calls for bond elections to build the "Ozark Trail" road, which would open up the heart of the Ozarks to travel and make connection with the Missonri system of roads.

An association has been formed to promote the construction of a road from St. Louis, through Little Rock and on to Houston and Galveston and the Gulf.

King county, Washington, will spend a little over three million dollars on public roads outside of incorporated towns and cities.

Minnesota will build three million dollars worth of state aid roads during 1916, the state paying half and the communities penetrated by state roads furnishing the other half.

Davidson county, N. C., during 1915 built about fifty miles of fine topsoil road, 28 miles of this being the route followed by the National Highway, Southern National Highway and Central Highway. The bridges are all of steel and concrete and the construction of the road is of the most up-to-date pattern. Ample provision is being made for maintenance. More than double that amount will be built during 1916.

Rowan county, N. C., commissioners have authorized the completion of the highway from Salisbury to the new city of Badin, on the Narrows of the Yadkin.

A new city road in Norfolk, Va., reaching to the municipal boat harbor is being put into fine shape and is nearly done.

Logan county, Ill., commissioners have voted to

build 30 miles of permanent dirt road, treated with oil.

Kane county, Ill., road supervisors are asking for a bond issue of \$1,500,000 to build 135 miles of concrete roads during the next five years.

Bonds for \$600,000 are soon to be issued for a coast road from Biloxi, Miss., to Pass Christian, a twenty-two-mile link in the Jackson Memorial highway. The motor road skirting the waters of the gulf and connecting Biloxi, Gulfport and Pass Christian was badly damaged and in places destroyed in a recent tropical hurricane.

On the eighth of last month White county, Tenn., had 1,200 able-bodied men to volunteer for co-operative road work. Several miles of grading was accomplished.

The 20 miles of gravel and shell road south from Sulphur, La., to Calcasieu parish with several large bridges, was completed last month at a cost of \$55,000.

Visiting motorists left 25 million dollars of good money in Massachusetts during the last touring, all because of far-sighted wisdom in building a system of good roads.

The last gaps of the new highways from Bristol to Elizabethton and from Bristol to Kingsport, Tenn., are about completed.

Cherokee county, S. C., road enthusiasts have drafted a bill for a bond issue to be submitted to the state legislature this month.

Approximately four million dollars from bond issues are now available for new construction on the public roads of the state of Tennessee.

A system of good roads in West Virginia should bring \$50,000,000 from tourists and save \$50,000,000 from tourists and save \$50,000,000 more in food stuffs.

The city of Gainesville, Fla., has voted \$21,000 for the building of better streets.

Stewart and Lincoln counties in Tennessee are lining up for good roads bonds issues of \$350,000 and \$200,000, respectively.

Contract for the construction of 68 miles of good roads was recently let at Titusville, Ga., and the work is now well underway.

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### Where Economy Comes In.

In its advocacy of good roads the Department of Rural Engineering of the University of Florida is sending out a statement calling attention to figures compiled by the United States Office of Public Roads. This says the present cost of transportation on country roads is 25 cents a ton for every mile. The cost varies with the kind of road. J. B. Davidson, of Iowa State College, quotes the following figures:

"Investigation shows that the cost of hauling over broken stone roads in good order is only 8 cents a ton for each mile; on broken stone roads in ordinary condition, the cost is 11.09 cents; on earth roads, with ruts and mud, the cost is 39 cents, and on sandy roads it is as much as 64 cents a ton mile."

Now suppose, argues the state expert, that you live on a sand road six miles from town as some folks do in Florida. It may not cost 64 cents a mile to haul a ton, but cut that in two. Suppose it is only 32 cent a mile. It will cost nearly \$2 to haul a ton of produce to market, not to mention the trip back home. If you live on a rock road in fair condition you can haul that ton at 11 cents a mile, practically one-third the cost of the sand road.

Suppose that you hauled 50 tons of produce over these bad roads during a year. It would cost nearly \$100. On good roads it would cost about one-third that amount. In other words, you would pay about \$65 a year for the privilege of bad roads, and you would pay it year after year. At the end of a few years you would have paid as much as a good road would have cost you and have the bad road still.

It is not practicable to improve all roads, but every community should have its good road and it could have by applying the surplus saved by such road to its construction. The Office of Public estimates that 25 per cent of the roads of the United States could be improved for \$2,000,000,000. The cost of hauling the yearly 265,000,000 tons of freight over roads in their present condition is \$500,000,000. At least half of this sum could be saved by good roads. By applying this saving to the cost of improving one-fourth of the roads, the debt could be paid in eight years. That is pretty quick returns.

St. Tammany Parish, La., road commissioners are taking a progressive step in awarding a definite maintenance contract for 175 miles of good roads and the bridges and culverts thereon.

Scott county, Tennessee, has sold its \$300,000 of bonds at a good price and already stretches of good roads have been begun.

Cumberland county, Tenn., road commission will build macadam roads with the proceeds of a \$100,000 bond issue sold recently.

Halifax county, N. C., will spend \$60,000 at once on new top soil roads.

Although a \$110,000 bond issue for roads and bridges in Volusia Co., Fla., was recently beaten another election will shortly be held.

Everything is being put in readiness for the expenditure of \$275,000 on the Tamiami Trail road in Florida.

Bids were received in December for the construction of ten gravel and nine concrete roads in Madison county, Indiana.

Good roads save in shoe shine and clothes cleaning bills in many instances more than would be our share in taxes to get the good roads.

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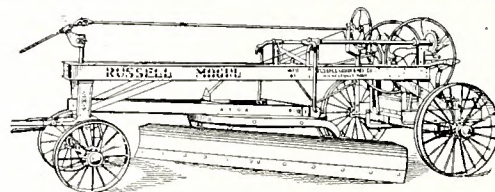
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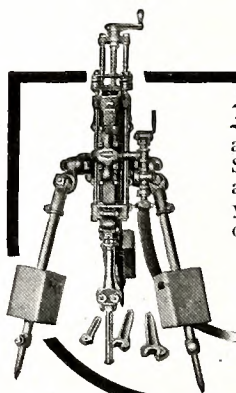
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# SOUTHERN GOOD ROADS

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## Mississippi's Finest Roads

By E. R. THOMAS

Resident Engineer of Warren County

I AM sending you a few photos of the recently improved roads of Warren county, Mississippi.

One cannot appreciate the engineering difficulties to be overcome since the work has been completed, as the entire appearance of the country has been so changed in reducing and raising the grades, widening and straightening the deep narrow gullies called roads.

The broken irregular topography confines the engineer in a limited way to the ridges on which the old roads have been located. These old highways vary in

culiarly of the soil. Some of the cross-section work was extremely difficult, it being necessary to take from 6 to 12 cross-sections per hundred feet. This work was done with a Locke Hand Level and the excavation and embankment quantities were balanced within 200 cubic yards per mile. In only two places has it been necessary to borrow material in large quantities, while the overhaul was kept within the minimum cost of \$606.00.

An accurate and complete record of every item of expense has been kept. A record of each car of material received, showing—Initial, No., Wt. Measurement, Dates of Shipment, Arrival and Release, the road and mile in which the material was placed has been kept. This was necessary as the contractor was paid by the ton mile haul. The total cubic yards of grading on the 28.5 miles was 447,916, about 15,700 yards per mile.

The total cost was \$320,381.69 or \$11,241.00 per mile.

A condensed statement of the expenditures will show how the funds were expended.

Vincennes Bdge. Co. Bdge. mate. furnished.	\$ 2,172.00
W. T. Young Bdge. Co., Bdge. mate. and contract.....	4,415.00
Vicksburg Bridge & Iron Works, bge. mate.	2,507.55
Southern Mfg. Co., culvert pipe.....	7,473.09
Novaculite Paving Co., road metal (rock)...	23,725.64
A. & V. R. Co., freight.....	64,293.68
Owens Cons. Co., construction work.....	167,837.18
H. F. Garbish, construction work.....	21,070.63
Merrill Road Imp. Co., asphalt surfacing...	14,177.45
Birmingham Slag Co., slag .....	386.97
Engineering .....	12,322.50

Total expenditure.....\$320,381.69

The amounts paid to the Owens Construction Co. and H. F. Garbish include all concrete work. All bridges and culverts were designed to carry 12 tons and are reinforced concrete and steel.

Cast iron culvert pipe was used, except a few lines on a road of lesser importance.

The first two contracts of about 23 miles was let to the Owens Construction Co., the third contract to H. F. Garbish.

The metal surface, Novaculite, was furnished by the Novaculite Paving Co. St. Louis, Mo., and was laid 7 inches loose and roled to about 5½"; width for the first two miles 16 feet the remainder 14 feet wide.

After this surface had been laid and opened to traffic for 6 or 8 months and had received its final bond, a ¾ in. surface of Asphalt was laid over about 15.5 miles



Through the Woods on Fine Roads of Warren County, Miss.

width from twelve to twenty feet, the banks are vertical and from 5 to 40 feet high. In not a few places trees have fallen across the roads from one bank to the other and in summer the dense overlapping foliage almost entirely excludes the sunshine.

For these reasons I am unable to furnish the "before improvement pictures" as I hoped, for the marks of identification are practicably impossible.

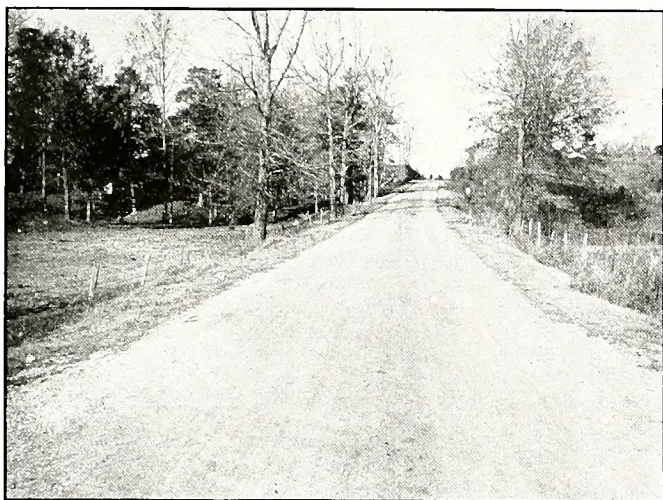
In revising the alignment the curvature has been reduced 40%, yet the new alignment is almost a series of reversed curves. In many places the old grades exceeded 20%; these have been reduced to a maximum 6% grade with one exception which is 6½%. The graded road bed is 24 feet on embankments and 30 feet in cuts. The cut slopes are ¼ to 1; these slopes in my opinion will in a few years be vertical owing to the pe-

by the Merrill Road Im. Co., Chattanooga, Tenn. Slag was used as a filler or aggregate for the asphalt. The remainder of the roads will be treated in like manner next summer.

While this work has greatly exceeded the anticipated

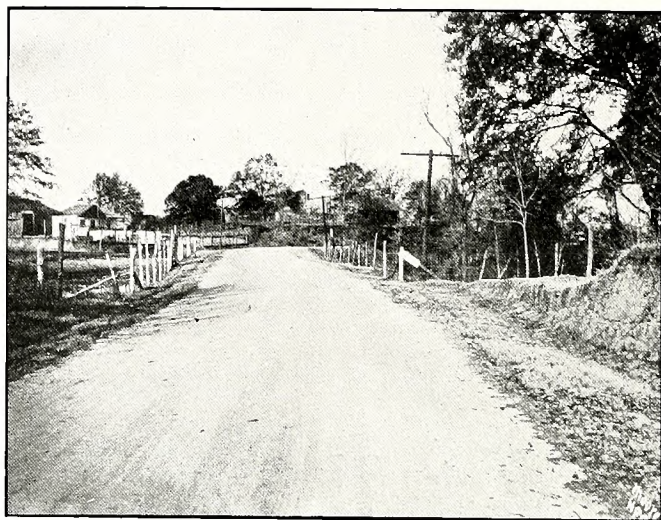
I feel confident that this has been the most difficult and expensive road construction in the South.

At a cost of about \$11,000.00, Warren and Hinds counties have cooperated in the construction of a steel



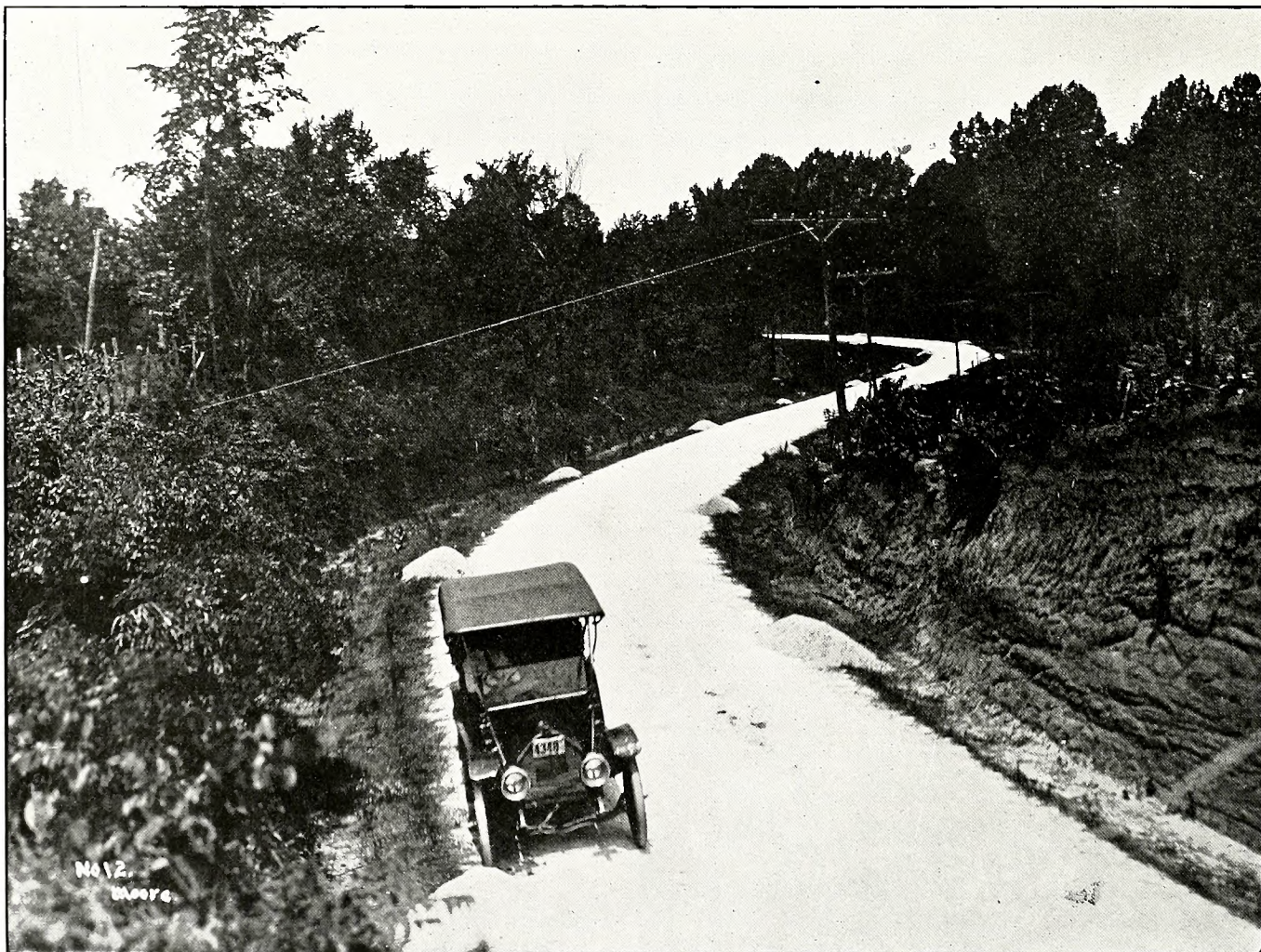
Beautiful Grade on Roads of Warren County, Miss.

cost by the Board of Supervisors and citizens, they are very grateful and appreciative in their expressions of praise of the work.



Rounding a Curve on Vicksburg and Meridian Road, Mississippi

concrete bridge 520 feet long over Big Black River. This structure is one of, if not the longest of its kind



Novaculite Road in Warren County, Mississippi, Built at Cost of Over \$11,000 a Mile



Another Novaculite Road With Asphalt Surface, Warren County, Miss.

in the state and reduces the distance from Vicksburg to Jackson about five miles.

In connection with this work Hinds and Rankin counties are making extensive improvements on their unimproved links of the Cross State Highway. This when completed will leave only about 20% of the distance from Vicksburg to Meridian unimproved. This Cross State Highway will be the Mississippi Division of "The Dixie Overland Route," extending from Savannah, Ga., to San Diego, Cal.

If you can find space for some of the photos and this statement in your publication it will be greatly appreciated.

#### Ten-Thousand Mile Highway Proposed.

Congressman Stephens of California has introduced a bill in the house which provides for constructing a 10,000-mile highway as a means of National defense. He believes that such a road would be useful not only in times of war, when it is often necessary to move great bodies of soldiers hurriedly, but also in times of peace. He says the bill, if adopted, will provide the following:

A national highway circling the United States within its borders, and running strategically near the Atlantic, Pacific and gulf coasts, as well as our northern and southern boundary lines.

A national highway, to be used in times of peace by automobiles, auto trucks and other vehicles for commercial and healthful purposes.

A national highway extraordinarily useful, when war threatens or we are attacked. Over it men in greatest numbers and munitions and supplies can be

transported quickly to any point north, south, east or west.

A national highway, 10,000 miles long, that will give work at good wages for many years to at least 100,000 American citizens in good times and to several times that number when times are hard.

A national highway providing physical and mental drill for all manual and clerical employees—thus fitting hundreds of thousands of young men for national defense—and to be better heads of families.

We are not familiar with the full details of Congressman Stephen's plan, but at first blush it is an attractive proposal. Certainly it is one form of military preparation which even the most radical pacifists can indorse without being expelled from the Good Example league. That a national highway would add materially to our preparedness cannot be doubted, as one of the government's greatest handicaps during the Civil war was its inability to transport troops rapidly. Indeed, it does not require a stretch of the imagination to believe that the horrors of the '60's would have been of shorter duration had there been better highways.

As an asset in times of peace such a highway needs no recommendation. In this day of travel, when distance is no barrier to commercial or social intercourse, good roads are indispensable.

Bincombe county, North Carolina, expects to spend \$140,000 in resurfacing, repairing and building new roads.

The city of Knoxville, Tenn., has purchased a 15-ton road roller for use on the streets of that place.

# Virginia Road Builders' Association

By GEO. E. WRAY

Pilkinton, Va.

**W**HEN President G. P. Coleman, state highway commissioner of Virginia, called the fifth annual convention of the Virginia Road Builders Association to order January 18, at Murphy's Auditorium, Richmond, he faced the largest gathering of road builders ever assembled in the state, and the call to order was made almost on the announced hour of 10:00 a. m.

After the usual address of welcome and responses, Governor Stuart, of Virginia, a road commissioner of twenty years experience, gave voice to a great many strong sentiments in regard to the theory and practice of roadbuilding, and many of his well-timed shots brought out round after round of applause. He said that no success can be possible in road making unless the people interested in the good roads uphold the road-making authorities. Those who failed to see the many advantages of good roads were vanishing and their influence was becoming powerless.

The governor touched upon some of his experiences in traveling over the state. He declined to name one

That day was past and there was danger now of having too much theory, too much leather-covered-cushion jobs, and too little practice, too little outdoor red-mud slave work on the roads. Good roads could be planned in an office but they could not be made there. And there were plenty of available practical men ready to undertake the work efficiently, while too often there were altogether too many so-called engineers who knew as little of real road construction as they knew of Hebrew. No road should be built except under proper plans and specifications and then the work should be turned over to practical men.

There was such a thing as too much professionalism, too much loading down of small enterprises by overhead expenses. We needed to use available practical men much more than we were now doing, men of local habitat, who knew the requirements of the people, men of an economic turn of mind, men who had the good of the local community at heart—These practical men could do better and more permanent work than the incompetent—so-called engineers. There was altogether too much road revenues being absorbed in engineering expenses.

## Keep Out of Politics

Then sometimes and in some counties road work becomes a mere matter of politics, where a few men could pull the wires as they pleased. Sometimes road work was turned over to contractors and he thought this was objectionable. The best road work was done by men on the ground who knew the need of the people and who conscientiously endeavored to render good service. He favored fewer engineers but the few engaged should be competent men and worthy of adequate compensation. Engineering knowledge was often too much diluted and too far from the point where it has to be applied.

The governor said that engineering knowledge should be used as a staff for the people to lean on and should not be made a burden for them to carry. Reduce the office work and increase the outdoor work—cut down on theory and spread out on practice. He hoped to see some satisfactory and sensible laws passed at the present session looking to the maintenance as well as the construction of permanent roads. He wanted every one of his hearers to get after their representatives and insist upon sane action in the matter.

With reference to road bonds the governor said there were too many 15 year roads built with 30-year bonds and urged greater sanity along this line. There was no need being as a permanent road—the best roads ever built needed constant maintenance and here the governor instanced the work of the maintenance corps in Massachusetts. A road may be a valuable asset or a heavy liability; it all depended on the question of maintenance. Paramount question proper in Virginia today was the question of good roads.

J. A. Pennybacker, chief of road economies at the federal office of public roads and rural engineering said taken as a whole local control of roads has, during a century of most liberal test proven a dismal failure. Ten years ago we were spending \$80,000,000 a year on



\$2,225 Gneiss Road at Beaver Dam, Virginia

county where the roads were so bad that it was impossible for the people to get together for any purpose whatever and contrasted this with his home county where congregations could be assembled in short order at any season of the year. Not only was the economic and material welfare of a community dependent upon good roads but so also was the moral, intellectual and spiritual welfare largely a question of good roads—permanently maintained roads.

The former governor stated that if he lived in a section where poor roads were the rule, he would move out of it, or transform the conditions. A locality so poor as to be unable or unwilling to make and maintain good roads was a mighty poor locality to stay in.

Governor Stuart then dealt with the practical side of the problem. The world needs men of vision, men who can see and plan for others, it also needs practical men who can carry out the plans efficiently. When the highway commission of Virginia was established ten years ago, experts were greatly needed, for the people knew next to nothing of real road construction.

roads, much of which consisted of local funds. This year counties are spending \$200,000,000.

#### **Tinkering Does Not Pay.**

Taking the mean expenditure of \$140,000,000 it gives us the impressive total of a billion and a half dollars outlay in ten years. "What have we to show for it? Take Virginia, count out the toll roads and those surfaced roads built under state control, and what have you left? Where are the roads built by county supervisors? Go wherever you will in these United States and you will find that the good roads are in those states where the state supervises the work.

"Hasn't it been clearly demonstrated that even where the state built the roads the counties won't take care of them? It is reasonable to expect such results because the county funds are spread thinly as a rule that a little tinkering is done on all the roads and no real improvement on any of them."

J. H. Montgomery, executive secretary, co-operative Education Association spoke on the relation of good roads to schools and all social work. He showed clearly enough that bad roads were the root of nearly all the ills of rural life, and gave numerous instances where good roads had more than doubled the attendance and the efficiency of the schools.

H. G. Shirley, chief engineer Maryland State Commission, spoke on the maintenance of roads as conduct-

ed in Maryland, where a vast amount of excellent work has been done under Mr. Shirley's supervision. His patrol system, by which there is always a man on every few miles of modern road taking care of the highway was explained and proved of great interest.

Scores of questions were fired instantly from the crowded audience and his ready answers were always very illuminating.

Mr. G. P. Coleman, state highway commissioner for Virginia, explained the work of his department, showing that the staff were at all times ready to cooperate with any and every effort to construct and maintain good highways.

He emphasized the message he had laid before the legislators—now in session—I urged delegates to get in touch with their representatives and thus help the good work along in every possible manner. Mr. Coleman was exceedingly well received, showing that he has the confidence and the support of the delegates, all of whom were road builders or county officials who have authority over road construction and who are thus brought in contact with the highway commission continually.

Senator Byrd, patron of a bill giving the local road authorities supervision over state road work, spoke on road-building from the county standpoint. He was opposed to the policy of highway commissioner Cole-



Beautiful Scene on New \$11,000 Per Mile Novaculite Road in Warren County, Miss. Note Old Road on Left.

man and said that the county authorities should have full charge of the distribution of all road monies. A resolution was offered that the convention endorse the Byrd bill, but Chairman Lassiter ruled this motion out of order. Hence the peculiar object of the bill was not lengthily discussed. The convention in the main favored a state and national plan for roads rather than go back to the kind of road-building in which each locality was a unit separate and distinct from state needs as a whole. Senator Byrd's scheme is diametrically opposed to the lesson of the records made clear by Mr. Pennybacker of Washington.

C. L. Scott, division engineer, spoke on the advantages and disadvantages of building roads by contract. S. L. Von Gemmenen, division engineer, gave a lucid talk on the construction and maintenance of earth roads, while C. B. Scott, assistant highway commissioner dealt with the location of highways.

A. G. Batcher, the energetic executive secretary of the American Automobile Association, spoke on traffic regulations and threw much light on this problem which confronts every one who has anything whatever to do with road construction and maintenance.

#### Resolutions Passed.

Perhaps the entire work of the convention can be summed up in the various resolutions adopted towards the close of the convention. These resolutions had been most carefully prepared by a strong committee, consisting of W. C. Saunders, chairman Board of Supervisors, Henrico county; G. Taylor Gwathmey, Norfolk County; G. L. Lupton, Frederiek; W. R. Ruffin, Danville; Harden Hariston, Henry; W. P. Moore, Bedford; J. Thomas Smith, Russell; C. B. Scott, Assistant State Highway Commissioner; P. S. Boxley, Orange; W. H. Aston, Washington; C. S. Luck, Hanover; W. A. Reid, Botetourt; Otto L. Evans, Amherst, and A. J. Johnson, James City.

1. An amendment to the present state aid road law, so as to provide that the State Highway Commission shall be authorized to agree with the local road authorities to properly grade and drain any road, or sections, tributary to a main traveled road, which they may deem necessary, and to improve such road or roads to meet the traffic conditions of such roads. The purpose of this is to give the county authorities more latitude in the selection of roads needing improvement with the assistance of state aid.

2. Granting the State Highway Department and the local road boards the same power given to certain public service corporations of exercising the right of way for public roads.

3. In accordance with the recommendation of the Governor and the State Highway Commissioner, the committee recommends that the maximum salary of resident and county engineers or superintendents may be increased from \$100 a month to \$150 a month, provided that such increase shall be approved by the local road authorities in conjunction with State Highway Commissioner.

4. Recommending an amendment to the present state aid law to provide that no election shall be held on any bond issue for a specific road improvement until estimates covering the cost of such improvement have been submitted to the court ordering the election, by the State Highway Commissioner, and no bond issue shall be voted for a less amount than the estimates so submitted, and provided further that as to all future bond issues, it shall be provided that no such bond issue shall be had except under the following conditions: That the Boards of Supervisors, in their annual levies,

in addition to providing for a sinking fund and the payment of interest, shall also provide a fund which shall be at least 3 per cent of such bond issue, which shall be applied to the maintenance of such roads. The purpose of this is to remedy the trouble arising out of bond issues being insufficient to improve the road to which the proceeds of the issue are to apply.

5. Whereas, the automobile has become the most important single factor in road maintenance, it is the sense of this convention that the money derived from the license tax on automobiles that the State aid road law be amended in accordance with this suggestion.

It is further recommended, if there be any county or counties which do not need all or part of the fund apportioned them as maintenance funds, then any such surplus may be used for construction of such highways or bridges as can be agreed upon by the State Highway Commissioner and the local road authorities.

It is further recommended that the state money and be increased to \$450,000, in the event that the automobile tax be segregated to maintenance.

6. Desiring to secure the maximum of convict labor for work on the roads of the state and at the same time reduce the expense of maintaining jails and prisons, the committee recommends that a law be enacted requiring the sergeant or jailer to make monthly reports of the number of prisoners and the terms of their sentence to the State Board of Charities and Corrections and to the Superintendent of the Penitentiary.

7. Assuming that it may not be possible for all the counties of the state to use their share of the State and road fund each year to the best advantage, it is the sense of the convention that all moneys apportioned to the several counties of the State by the State Highway Commissioner shall remain to the credit of the county for a period of not less than five years.

8. Recommends that a paper by W. N. Ruffin on "Capitation Tax" be referred to a committee of five for further consideration, to be reported either to the state legislature or to the next meeting of the association.

9. That the Virginia delegation in Congress be urged to support the bill which provides for the appropriation of Federal aid to State highways.

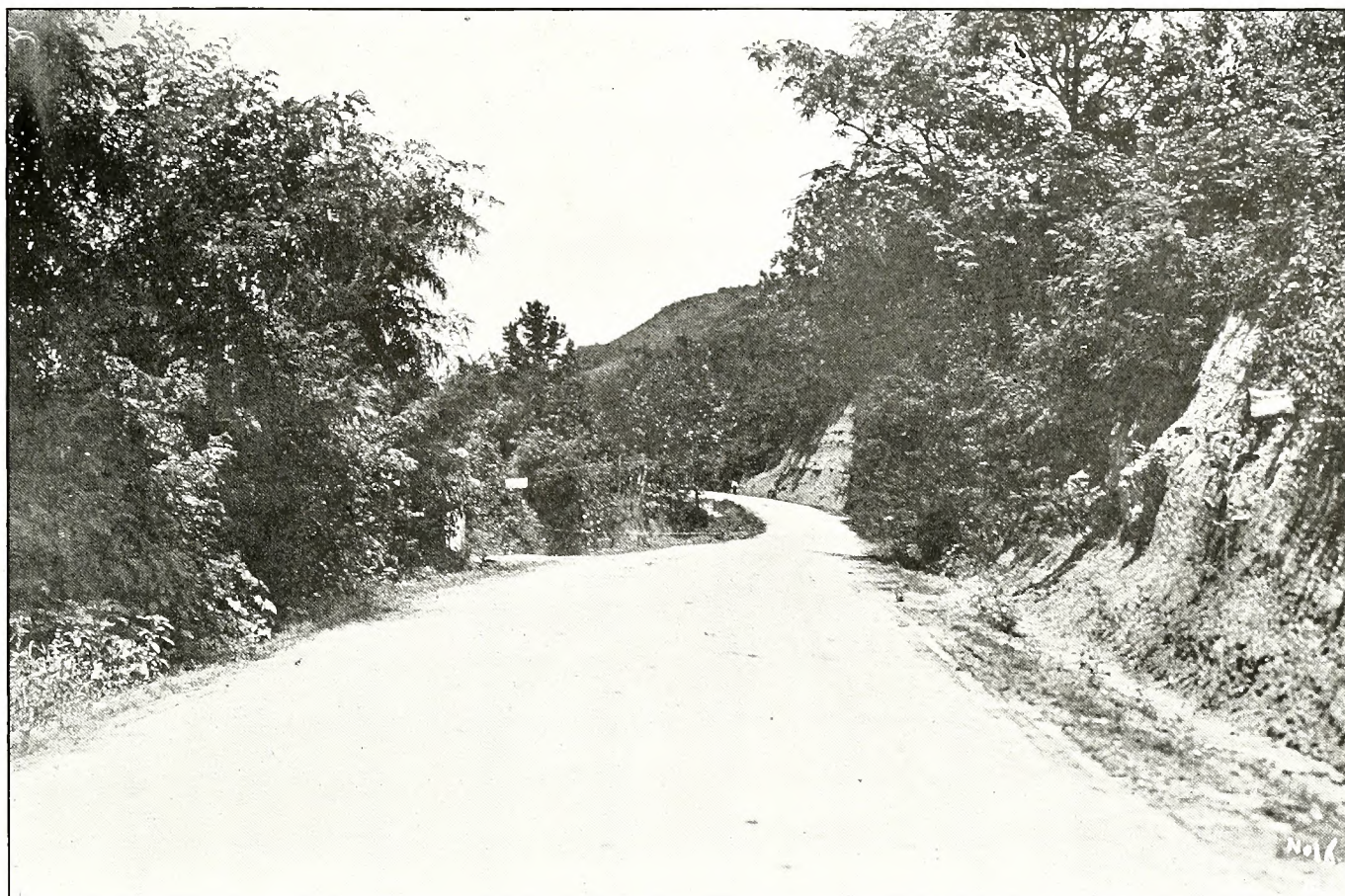
10. Recommends amending the law so as to require all dealers and agents to report promptly all automobile sales to the Secretary of the Commonwealth, and also that the owners shall report the fact of such ownership to the clerk of the Circuit Court of the county or the Corporation Court of the city in which they reside.

11. Recommends the passage of a law providing for the establishment, construction and maintenance of State highways which are connecting links in national roads. The cost of such roads is to be borne by the state, cities and counties through which the roads pass, in proper ratio of cost.

Some of these resolutions were fought out strongly, one by one, but they were all finally adopted as a whole unanimously.

Mrs. Valentine, an equal suffragist, managed to secure a hearing, on the understanding that she was to speak on good roads. When this lady had thoroughly established herself with the audience by showing the dire necessity of road maintenance, she said the way to get all the roads of the country in permanently good condition would be to give the ballot to the many thousands of property owning and tax-paying women.

At the conclusion of the meeting and after much had been said on both sides as to the policy of the work of the state highway commission a vote of confidence in Commissioner Coleman was carried with much vigor



Heavy Grading on Vicksburg Route, Warren County, Miss.

and enthusiasm. The commissioner's work was unanimously approved.

The following officers were elected:

President, Otto L. Evans, Amherst; 1st vice president, Mayor J. W. Wood, Richmond; 2nd vice president, G. Tayloe Gwartmey, Norfolk; Secretary & Treasurer, C. B. Scott, Richmond.

#### Executive Committee.

W. C. Saunders, chairman, Glen Allen; J. F. Harpe, Waynesboro; E. S. Fenner, Lebanon; M. B. Rowe, Fredericksburg; Wade Massie, Washington; B. R. Cowper, Columbia; L. L. von Gemmingen, Lynchburg; R. H. Wood, Charlottesville; G. P. Coleman, Richmond; J. E. Walker, Salem; Chas. T. Lassiter, Petersburg.

#### Atlantic Coast Highway Good.

Road travel over the Atlantic Coast Highway, which is the recently adopted name for the Quebec-Miami route, increased so rapidly in the late fall and early winter that the Touring Information Board of the American Automobile Association—to satisfy the multiplying demands for the latest information about the main artery between the North and the South—sent two of its touring experts from New York City to Florida in a trip which proved exceedingly illuminating. E. L. Ferguson of the Washington headquarters, and J. A. Hemstreet of the New York bureau, who have been over the route several times, found that a wonderful development had taken place during the past year.

By careful selection of routing from point to point, in some places making slight detours to incorporate completed highways rather than take a more direct

line over short cuts of unimproved roads, an itinerary of 1,000 miles from New York City to Jacksonville was laid out in which less than 150 miles of uncompleted highway are included. This 150 miles is made up of stretches varying from 1 mile to 27 miles in length, all of which is graded and some of which is being surfaced with wearing materials.

In the entire route from the Hudson to the St. Johns there is only about 25 miles unprovided for as to completion of surfacing, the grading having been done and fully one-half of the mileage is at least fair. There are only two very short places which would be bad in continuous wet weather. The result of the surveying trip will be put into detailed form to be issued as a special route book connecting the north and the south.

Florida now has a state highway commission, and the state is busily at work in the accomplishment of a connected system of roads which will increase its winter visitors many fold. Both the east and the west coasts are equally energetic, and within a comparatively short period the "Land of Flowers" promises to be gridironed with improved roads, which work will proceed quite rapidly as the need of grading is at a minimum because of the topography of the state.

In a recent issue of the Army and Navy Journal, published at New York, appears an article by Lieut.-Col. Henry T. Allen, of the Eleventh United States cavalry, on the Dixie highway. Col. Allen explains the many advantages of good roads from a military standpoint. He pointed out the Dixie highway as an especially necessary road, as it passes through a section of the country that is considered the greatest military asset of any large part of the United States.

# Annual Meeting United States Good Roads Association

By J. A. ROUNTREE, Secretary

THE annual meeting of the United States Good Roads Association met in Birmingham, Ala., the private ball room of the Tutwiler Hotel, Tuesday morning, January 11, 1916, at ten o'clock. The convention was called to order by Hon. John W. O'Neill, vice president, who stated that the object of the meeting was for the purpose of hearing the annual reports of the officers to map out the work of the association, elect officers for the ensuing year. He stated that he regretted very much that United States Senator John H. Bankhead, the first and only president the association ever had, could not be with us on account of his official duties in Washington. Mr. O'Neill said he knew that Senator Bankhead was with us in spirit if not in person. He congratulated the association that the body had its origin in Birmingham and that it was national in scope and the organization had officers and members in over twenty-five states in the union, and that the association was incorporated under the laws of Alabama. He congratulated the association on the splendid work that has been done during the past twelve months in advancing the cause of good roads throughout the nation. Mr. O'Neill welcomed the members heartily to the city and wished for them a pleasant stay. He closed his address by saying "We are here for business and not for long winded speeches, so we will now proceed with business."

Mr. J. A. Rountree, Secretary of the United States Good Roads Association, read the official call for the meeting in accordance with the incorporation laws of Alabama and the constitution of the association. Secretary Rountree called the roll of members and the following were in attendance in person or by proxy.

John W. O'Neill, of Birmingham, Vice President.

E. J. Watson, of Columbia, S. C., Vice President.

Directors for their respective States.

Alabama—Gardner Greene, Pell City; Arizona—J. J. Keagan, Globe; Arkansas—Judge C. M. Philpot, Pine Bluff; California—S. Eugene De Rackin, Imperial; South Carolina—F. Horton Colecock, Bluffton; Tennessee—C. C. Gilbert, Nashville; J. A. Patten, Chattanooga; North Carolina—S. H. Lea, Charlotte; Louisiana—W. E. Monroe, Delhi; J. A. Rountree, secretary, Birmingham, Ala.; D. C. Gillett, Tampa, Fla.; P. L. Atherton, Louisville, K.; Judge J. C. Higgins, Nashville, Tenn.; A. B. Paterson, Meridian, Miss.; J. J. Gray, Jr., Rockdale, Tenn.; Congressman John L. Burnett, Gadsden, Ala.; J. B. Walter, Snowdon, Ala.; Dr. Geo. H. Denny, University, Ala.; Jas. B. Ellis, Selma, Ala.; Lawrence Cooper, Huntsville, Ala.; C. W. Ashcraft, Florence, Ala.; F. A. Gulletge, Verbena, Ala.; H. B. Terrill, Austin, Texas; W. D. Harrigan, Fulton, Ala.; J. E. Pierce, Editor, Times, Huntsville, Ala.; W. Scott Maxwell, Cordova, Ala.; Judge C. E. Thomas, Prattville, Ala.; C. A. Stiefelmeyer, Cullman, Ala.; Dr. R. F. Lovelady, president Board of Revenue, Birmingham, Ala.; Hon. James Weatherly, member of city commission, Birmingham, Ala.; D. C. Turnipseed, Union Springs, Ala.; Mrs. Nora E. Miller, Dadeville, Ala.; Hugh McGeever, member Board of Revenue, Birmingham, Ala.; L. H. Penington, member Board

of Revenue, Birmingham, Ala.; G. A. Nelson, New Decatur, Ala.; Geo. H. Clark, road engineer of Jefferson county, Birmingham. Several hundred delegates registered.

## Report of the Secretary.

J. A. Rountree read his annual report. First, he gave a report of the duty imposed upon him to have the association legally incorporated under the laws of Alabama. He read the minutes of the annual meeting and gave in detail the work of the incorporation, and exhibited the written authority of each incorporator. He exhibited certificates of incorporation from the Probate Judge of Jefferson county and the Secretary of State.

Second, he reported a list of all life and regular members of the association. He gave an itemized statement of moneys received from memberships and otherwise. Also gave an itemized statement with vouchers of all moneys expended.

Third, he reported contracts that had been made with field agents that were authorized at the last annual meeting.

Fourth, his report showed that the officers and members had been right active in assisting in organizing the Dixie Highway, Jackson Highway, Forrest Highway, Southern National Highway, Jefferson Highway and a number of state highways.

Fifth, the report showed that the association had sent out a considerable amount of literature in various parts of the United States in helping to promote good roads campaigns, also, had taken active interest in assisting in securing good roads legislation in a number of states in the union.

Sixth, the association had actively pushed the agitation for the observance of "Good Roads Days" in every state in the union and twenty odd states observed the same last year. The Alabama legislature legalized August 14th and 15th as Good Roads Days. It is hoped that other states will follow the example.

Seventh. The association is to be congratulated on having at the head of the committee on postoffice and post roads, Senator John H. Bankhead, a life member and the first and only president that the association has ever had. The report paid a tribute to his splendid work for the cause of good roads, and the Bankhead Good Roads bill that is now pending in Congress.

Eighth. He reported that the Alabama Good Roads Association passed a resolution at its last annual meeting to affiliate with the association, and that the National Highways Association of Washington, D. C., has requested affiliation, as well as a number of state and district organizations.

Ninth. Secretary Rountree closed his report by making a number of suggestions in regard to advancing the work of the association and predicting that by the time the next annual meeting the organization would have members in nearly every state in the union and would be the most powerful and influential good roads body in existence.

At the conclusion of Secretary Rountree's report

the following resolution was introduced by G. A. Nelson of New Decatur and unanimously adopted.

Resolved, That the United States Good Roads Association, Inc., in convention accept the report of Secretary Rountree and most heartily endorse his splendid work in the conduct and discharge of the duties of his office, and extend him a vote of thanks for the same.

#### The Officers Elected.

The committee on nominations reported the following which were unanimously elected:

United States Senator John H. Bankhead, president; Del M. Potter, of Clifton, Ariz., first vice president; E. J. Watson, of Columbia, S. C., second vice president; John W. O'Neill, of Birmingham, Ala., third vice president; J. A. Rountree, of Birmingham, Ala., secretary-treasurer.

#### Directors.

Alabama—Gardner Greene, Pell City; Hugh McGeever, Birmingham; Arizona—J. J. McKagan, Globe; Ari-Philpot, Pine Bluff; California—S. Eugene De Rackin,



Maryland Patrol System. A Man for Every 12 Miles of Macadam and Asphalt

Imperial; Florida—D. C. Gillett, Tampa; Georgia—Wright Willingham, Rome; Illinois—E. D. Funk, Bloomington; Kansas—G. C. Glynne, Iola; Kentucky—P. L. Atherton, Louisville; Louisiana—W. E. Monroe, Delhi; Michigan—R. D. Chapin, Detroit; Minnesota—Wm. Bull, St. Paul; Missouri—Cliff Williams, Meridian; Mississippi—Geo. F. Grayson, Biloxi; Missouri—E. W. Major, Sedalia; Missouri—T. T. Fannle-roy, St. Louis; Nebraska—Wm. Stull, Omaha; New Mexico—S. M. Johnston, Roswell; North Carolina—S. H. Lea, Charlotte; Oklahoma—L. D. Marr, Tulsa; South Carolina—F. Horton Colcock, Bluffton; South Dakota—Lucien D. Lea, Lead; Tennessee—J. A. Patten, Chattanooga; Tennessee—C. C. Gilbert, Nashville; Texas—H. B. Terrill, Austin.

Alabama State Vice Presidents, S. C. Turnipseed, Union Springs, J. A. Gulledege, Verbena, W. D. Hennington, Fulton.

Three vice presidents from each state represented will be elected by the Board of Directors, who are empowered to fill all vacancies, and the election of directors and vice presidents from other states.

#### Report on Resolutions.

The Committee on Resolutions makes the following report: Whereas, Economic and social conditions in the nation are such as to demand that the most com-

plete transportation facilities be provided for the successful agricultural and industrial development and for the commerce of the nation; and

Whereas, The question of good highways at this stage of the nation's development is of vital concern to the people.

Whereas, It is estimated by the Department of Agriculture that improved highways would save the producers of the nation, if any twenty per cent of the highways were improved, somewhere between half a billion and a billion dollars annually; and

Whereas, There can be no sound economic development of the nation without attention to the public highways; and

Whereas, Section 8, Article I, of the constitution of the United States Good Roads Association makes it mandatory upon the Federal Government to give proper attention to the construction and maintenance of post roads upon which the masses of the people are now more dependent than ever; and

Whereas, While the immense public revenues are being expended for destructive purposes, and the proposed preparedness program is being agitated and discussed in Congress, we desire to call attention to our senators and congressmen that the expenditures and appropriations for constructive purpose—agriculture, commerce, education and highways are but a bagatelle; and

Whereas, Legislation to this end is solemnly pledged in the platform of the National Democratic Party; and

Whereas, The President of the United States has very properly declared that "You cannot rationally increase the prosperity of this country without increasing the road facilities of this country."

Whereas, There appears to be too long delay in action owing to conflicting suggestions as to methods, now, therefore, be it Resolved, That the United States Good Roads Association (Inc.) voicing the sentiment of the people of the twenty-five states here represented, earnestly request the president and congress of the United States to take up the question of proper provision for the construction and maintenance of public highways, and so dispose of it as to afford the greatest good to the greatest number, looking to such work in co-operation with the several states, under state laws, to the preservation of the principle of local self government, to an equitable distribution of funds, and to the extension of the work even unto the minor subdivisions and ultimately to a comprehensive system of National Highways. We urge the Committees on Roads of the two houses of Congress to confer, and agree upon a measure that will be proper substitute for all the measures pending and to no longer delay action owing to petty consideration as to method.

Resolved 2nd, That with no thought of dictating to those two great committees, but, we desire to heartily endorse the "Bankhead Good Roads" bill that appropriates \$25,000,000 for the building and maintenance of good roads, which has been introduced in the United States Senate and urge its passage immediately or a bill of similar nature. Resolved further, That we desire and urge our members in Congress to give us an appropriation for building of roads, before they start on the passage of appropriations for "Preparedness."

#### System of Highways.

Resolved, 1st, That the United States Good Roads Association, Inc., recommend that a system of national

highways be built by the federal government, running east and west across the continent from ocean to ocean, aggregating about five national roads which will pass through each of the five tiers of states so that each state may have the benefits of said national highway.

2. That the state engineers of each state cooperate with the federal engineers, in the laying out of the work, through their respective states.

3. That the state engineers lay out their state highways north and south intersecting with the National Highways.

4. That the county engineers lay out their county highways intersecting with the national highways.

5. That the township roads be laid out to intersect the county roads so that we shall have a system of highways interlocking each other from the farm up to the national roads. Then the road builders will have a plan to work to. The work can be commenced at any point, where most needed, as time goes on; and when the system is completed every section of the country will be a benefactor of one great central system or net work of public highways.

#### **Consolidations and Affiliations.**

Resolved. That the President Secretary and Board of Directors be authorized and empowered to negotiate and consummate, amalgamate all national, state, district, county and township good roads associations and individuals in one compact body.

#### **Good Roads Days.**

Whereas, The United States Good Roads Association, Inc., started the movement of observing two days each year, as "Good Roads Days" throughout the United States and

Whereas, The Association has secured the observance of these days in twenty odd states in the Union; and

Whereas, the observance of "Good Roads Days" has become nation-wide; therefore be it

Resolved, That we request Congress to adopt a day to be known as "Good Roads Day" and that the same be a legal holiday, making it the duty of the President of the United States to issue a proclamation calling upon the people in their respective states to fittingly observe the same.

#### **Election of Honorary Members.**

Whereas, The constitution of the United States Good Roads Association, Inc., provides for the election of the governors of the states represented in this association as honorary members, therefore be it Resolved, That the secretary be charged with the duty to notify each governor of his election and to issue a certificate of membership in the name of the President and Board of Directors.

#### **Life Members.**

Resolved, That this association confirm and elect the twenty-five or more worthy and distinguished citizens from each state in the Union that have been or may be proposed for life members in this association, and that they be notified of their election, and if said persons qualify as per the constitution, certificates of membership shall be issued by the Secretary in the name of the "President and Executive Board."

#### **Thanks to Incorporators.**

Resolved, That this association heartily return its thanks to the special committee for incorporating and placing this association on a business and useful basis,

and that we hereby spread their names on the records of the association, which is as follows:

J. A. Rountree, of Alabama; John W. O'Neill, of Alabama; Dell M. Potter, of Arizona; E. J. Watson, of South Carolina; Gardner Greene, of Alabama; J. J. Keagan, of Arizona; C. M. Philpot, of Arkansas; S. Eugene De Rackin, of California; W. E. Monroe, of Louisiana; F. Horton Colecock, of South Carolina; S. S. H. Lea, of South Dakota; E. B. Almon, of Alabama; Oscar Underwood, of Alabama; Fred L. Blackmon, of Alabama; John L. Burnett, of Alabama; J. E. Pierce, of Alabama; G. A. Nelson, of Alabama; F. A. Cullledge, of Alabama.

#### **Officers Endorsement of Highways.**

Whereas, The officers and members of this association have taken an active part in organizing and promoting the Dixie Highway, the Southern National Highway, the Forrest Highway, Jackson Highway and Jefferson Highway, therefore be it

Resolved, That we heartily endorse these great roads and urge that they be speedily built as possible and that if congress makes special appropriations for the building of special highways that they be taken care of in special appropriations.

#### **Campaigns For Organization.**

Resolved, That the Secretary be empowered to push the campaign for securing new members and organizing branch associations in every state in the union and do all things necessary to push the usefulness of the same.

#### **Thanks to Officers.**

Resolved, That the thanks of this association be extended to United States Senator J. H. Bankhead, the first and only president of this association, for the splendid administration of affairs of this great body, which promises so much in advancing the cause of good roads. Resolved 2nd, That the thanks of this body are heartily tendered Mr. J. A. Rountree, the first and only secretary that this body has ever had, for his untiring work in pushing the usefulness of this organization, and that we heartily endorse his execution of the work mapped out by this body.

Whereas, six cities of this country have extended invitations to hold a great good roads Congress in their midst as their guest, therefore, be it

Resolved, That the Secretary be empowered to confer with these cities and report the same to the Board of directors to decide on the place of holding this good roads Congress.

#### **Dues of Regular Members**

Resolved, That it is the essence of this convention that the dues of all regular members who are on the rolls of this association be dated from January 1st, 1916 and that they be notified of the same. Also that an invitation be extended to each regular member to become a life member as per the constitution of the association.

#### **Annual Meetings.**

Resolved, That Article 8, Section 1, of the constitution of the United States Good Roads Association be changed to read that the annual meetings shall be held on the second Tuesday in April, 1917, and each year thereafter in the city of Birmingham, Alabama, for the purpose of electing officers and for the transaction of any other business in the interest of the association. All classes of members (life and annual) except honorary, may vote by proxy.

## House Passes Shackleford Bill

**B**Y a VOTE of 281 to 81 the House of Representatives at Washington has passed what is called "The Shackleford Bill" carrying an appropriation of \$25,000,000 to aid the states in improving their public roads used in the postal service of the Government. Sixteen or seventeen bills, probably more, relating to the same subject have been submitted to the House at its present session, and all of them, though differing somewhat in minor details are to the same general effect that it is well within the constitutional rights and certainly the imperative duty of the Congress to provide out of the public treasury for this great public necessity.

The Bill as it passed the House provides that in certain cases, clearly defined in the bill, the Secretary of Agriculture shall aid the states in the construction and maintenance of rural post roads, which means "any public road over which rural mail is, or might be, carried outside of incorporated cities, towns or boroughs having a population exceeding 2,000." The expense of administering the fund thus provided is to be paid out of the fund. Each state is to receive outright the sum of \$65,000 and one-half of the remainder to be divided is to be apportioned among the states according to population and the remaining half according to the mileage of rural free delivery routes to the extent that such population and rural free delivery routes bear to the population and free delivery routes of all the states.

The administration of the fund is to be under the general direction of the Secretary of Agriculture and its distribution is to be regulated upon terms which will protect the Federal Treasury and assure the satisfactory completion of the work undertaken. The Secretary will do his part through the highway departments of the several states, and, in the absence of such departments, through such representatives of the State as may be agreed upon by the Secretary and the Governor. Upon application from the states for aid in the construction of any rural post road the Secretary is to decide whether or not the aid desired comes within the provisions of the bill and if he shall decide in favor of the proposed road he shall require plans, specifications and estimates of cost for his approval. Upon approval and the acceptance of the State of the conditions upon which Federal aid will be given the Secretary will have the authority to give not less than 30 per cent nor more 50 per cent of the reasonable cost of construction or maintenance of the road thus approved.

All construction and maintenance of roads under this bill shall be under the supervision and control of the state highway departments of the states. In such states as have no highway department the apportionment of the fund for such state shall be expended in such manner as the secretary and the governor may agree upon. The Secretary is authorized to make or direct such examination and inspection of any road constructed or maintained under the provisions of the Act and "to prescribe such rules and regulations for the administration of this Act as he may consider expedient." All payments for road construction under the Act are to be made upon warrants drawn by the Secretary of Agriculture. The state desiring aid under the Act "may apply" and the Secretary may approve or reject the application. So far as the Federal Treasury is concerned, the Act "is horse-high, bull-strong and pig-tight." It is pure business and without the least touch of sentiment.

If the maximum of \$25,000,000 provided in the Act be appropriated, the total amount of aid to each state, counting population, rural free delivery roads and star routes, will be: Alabama \$579,180; Arizona, \$117,512; Arkansas \$430,396; California, \$504,788; Colorado, \$253,168; Connecticut, \$258,638; Delaware, \$103,290; Florida, \$220,348; Georgia, \$722,494; Idaho, \$170,024; Illinois, \$1,372,330; Indiana, \$854,868; Iowa, \$841,740; Kansas, \$747,655; Kentucky, \$580,274; Louisiana, \$345,064; Maine, \$276,142; Maryland, \$318,808; Massachusetts, \$535,420; Michigan, \$850,492; Minnesota, \$733,434; Mississippi, \$497,130; Missouri, \$974,114; Montana, \$192,998; Nebraska, \$514,634; Nevada, \$101,102; New Hampshire, \$175,494; New Jersey, \$438,054; New Mexico, \$155,802; New York, \$1,594,412; North Carolina, \$655,760; North Dakota, \$325,372; Ohio, \$1,198,384; Oklahoma, \$532,138; Oregon, \$248,792; Pennsylvania, \$1,469,696; Rhode Island, \$139,392; South Carolina, \$442,430; South Dakota, \$337,406; Tennessee, \$694,050; Texas, \$1,070,386; Utah, \$143,768; Vermont, \$187,528; Virginia, \$591,214; Washington, \$301,304; West Virginia, \$340,688; Wisconsin, \$736,716; Wyoming, \$125,170.

The Act does not mean that the United States is going into general road construction in the several states; but that it will aid the states in the construction of certain specified highways to the extent of \$25,000,000 annually, the states to provide a like amount for the construction of such roads. In round numbers, there are about 2,250,000 miles of public roads in the United States and the last year the expenditures on account of road construction made by the states, counties, townships and districts, including the estimated value of convict labor, aggregated about \$235,000,000. It is estimated that the cost of construction and maintenance amounted to about \$260,000,000; so that the appropriation provided for in "The Shackleford Bill" is very small compared with the enormous amount required for road construction in the country. It is a beginning, however, and shows at least the progress of the good roads movement. Last year a similar bill was passed by the House by an overwhelming majority. The hearings by the special committee charged with the work lasted for weeks and the statement of the chairman in introducing the witnesses that "there is no question in the minds of this committee as to the necessity for improving the roads of this country and desirability of the government contributing something toward their construction and maintenance" became almost stereotyped. Speeches almost without end were made, and in the present Congress there is none to question the necessity of good roads for any reason commercial, industrial or social. The main objection made by members of the present Congress who spoke against the measure was the State of the Federal Treasury and the more immediate necessity of providing for the defense of the country against any enemies that might appear.

What the Senate will do with the good roads bill remains to be seen. The Senate killed the bill last year and the Senate does not quickly change its spots. The present bill has been prepared with the greatest care and is the result of the best thought of those who have given many years' study to the subject.

Hill county, Texas, farmers are joining in with the road commission to make the \$150,000 bond issue build as many miles of road as possible.

# Pomona Terra-Cotta Segment Blocks for Large Culverts



This cut shows a 60 inch Arch Terra-Cotta Segment Block Culvert erected in

## WAYNE COUNTY, N. C.

Wayne road officials were so well pleased with this job that they have since placed orders for more, and will continue to install them on account of their durability and economy.

### A Letter from Mr. J. G. Foushee, Com. of Public Works, Greensboro, N. C.:

DEAR SIRs:

We have just completed two street culverts, both built with your **SEGMENT CULVERT BLOCK**, one of them full circle and the other half circle.

We are very much pleased with these blocks in regard to strength, and also the ease with which it is laid.

I can heartily recommend your blocks, and believe you have solved the problem of building large culverts, sewers and other conduits.

Yours very truly,

J. G. FOUSHEE,  
Commissioner of Public Works,  
City of Greensboro, N. C.

October 27th, 1915.



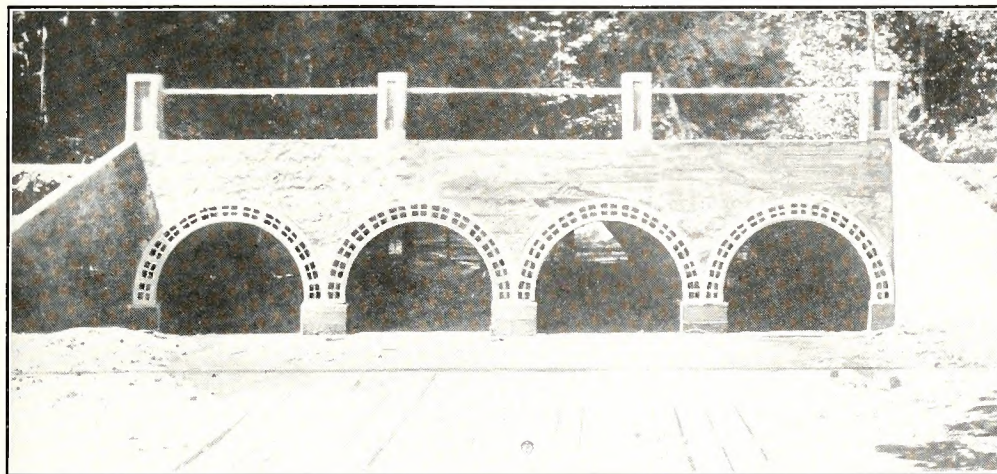
84-inch Half Circle  
Under West Market Street  
Greensboro, N. C.



48-inch Full Circle  
Under Walker Avenue  
Greensboro, N. C.

**"It Costs Less and Lasts Longer."**

## TERRA-COTTA SEGMENT BLOCKS IN BRIDGE CONSTRUCTION



Half or full circle may be grouped as shown in cut so as to make bridge culverts of quite large carrying capacity. Cut shows four 84-inch Arch Culvert Bridge constructed of Terra-Cotta Segment Blocks near Waynesboro, Ga. A similar job is being constructed in Guilford County, N. C., with five arches instead of four.

Small bridges like this can be constructed at much less expense than of other material and will last a hundred years.

### POMONA SEGMENT BLOCK CULVERTS IN RALEIGH, N. C.

letter from Mr. Hood of the Parker-Huntley Realty Co.:

Gentlemen:—

"We have used about 1500 ft. of your Segment Block Culvert in Cameron Park, and are more than satisfied with the result. We have great faith in its lasting qualities, and the culvert, while being unusually substantial, was easily constructed. The Segment Blocks were laid easily and rapidly by men who had previous experience. We shall certainly use more of them in the future.

Yours very truly,

R. C. Hood, Sec. and Manager.



Vitrified, salt glazed Terra-Cotta Culverts, 12 to 24 inches in diameter. Made of Shale Rock Clays. Full weight and strength for small road Culverts.

### For Twenty Years the Standard

POMONA SEGMENT BLOCK CULVERTS are made in various sizes, both in full and half circle, from 36 to 84 inches in diameter. The most popular type for large road culverts is the half circle, 60 to 84 inches in diameter.

Catalog, Blue Prints, Prices and full information mailed on request.

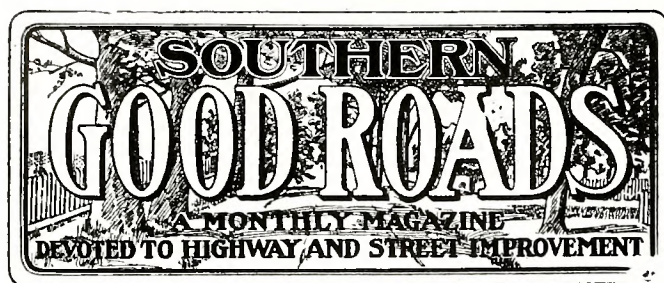
We have in our employ skilled specialty men in this line, who will be glad to call on you at any time to take up this matter with county or township boards, city and town officials or individuals.

## POMONA TERRA-COTTA COMPANY

POMONA, N. C.

Manufacturers Sewer, Culvert, Conduit  
and Well Pipe, Flue Liners, Drain  
Tile and Other Clay Products





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**Official Organ of the North Carolina Good Roads Association**

HENRY B. VARNER, President, Lexington, N. C.  
DR. JOSEPH HYDE PRATT, Secretary, Chapel Hill, N. C.

**Official Organ Southern Appalachian Good Roads Association**

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C. B. SCOTT, Secretary, Lynchburg, Va.

**Official Organ of the South Carolina Good Roads Association**

F. H. HYATT, President, Columbia, S. C.  
FINGAL C. BLACK, Secretary, Columbia, S. C.

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**RICHMOND-WASHINGTON ROAD.**

It is a conservative estimate that the automobile traffic from the South Atlantic States, through Richmond on to Washington, was more than doubled during the past year. This spring and summer is expected to bring about an increase that will far surpass any in the past. Not only will people from the South motor northward to Washington and on to Atlantic City and New York, but many of North will come South to tour the good roads of Dixie and visit our great mountain country. The logical route for the people of the coastal sections of the Southeast to travel northward is through Richmond and straight on to Washington.

But here is where the rub comes, for during the past few months these people have been unable to make that route. A person from Raleigh, Durham, Goldsboro or Wilmington, in North Carolina, desiring to motor to Washington must detour by Charlottesville and Staunton and on up the Shenandoah valley toward Hagerstown. A glance at the map will suffice to convince one that this should not be. People of the South wonder why it is that the road that should be their gateway is one of the worst in the country.

Richmond and Washington are too progressive cities to allow this undesirable situation to longer remain without a big effort to remedy it. They would benefit their cities greatly and confer a blessing on the motorists who live south of them. More and more

each year the motor car is becoming the vehicle for long pleasure trips, and with a good road between Richmond and Washington this would increase. This is the best route also for the men of the North who wish to come by motor to Pinehurst and the other great winter resorts, including Florida, and its completion would be pleasing alike to the people north and south of these two cities, as well as of large benefit to that section.

**WAGON MAKERS CAN HELP.**

Now is the time of the year when the narrow wagon tire is the worst enemy of the good road, especially of the top-soil and sand clay type. During the long rainy seasons it is impossible, even with the best methods of maintenance to keep the top of our roads from becoming moist and softer than in the summer months. The softer the road becomes, the worse it will be injured by traffic. And the narrower the tire the deeper will be the rut it makes in the road. Southern Good Roads believes that the wide tire law is needed in every state and that it should be strictly enforced.

It might not be amiss, however, to make the suggestion here that the wagon makers could render a great help for good roads by voluntarily widening the tires on all makes of wagons, especially the narrow-tired vehicles they are now turning out. Eventually they may be forced to it, for when the owner is forced to pay tax on narrow tires he is going buy broader ones. He will thereby escape the tax and bring about the result desired by the friends of good highways. Before this may come about, however, great damage can be inflicted by narrow tires. But if the wagon makers would eliminate this nuisance the trouble would quickly adjust itself.

**Appalachian President Makes Appeal.**

President Joseph Hyde Pratt has been mailing out a letter to all members of the Southern Appalachian Good Roads Association, calling attention to the magnitude of the work being carried on and of the necessity of funds to meet the expenses of the association. The response has been gratifying, but not enough money is yet in sight to keep the work going at a rate commensurate with the needs and opportunities. President Pratt's letter, under date of Chapel Hill, N. C., is as follows:

"My dear Sir:—

"The Seventh Annual Convention of the Southern Appalachian Good Roads Association held at Bluefield West Virginia, October 14-16, 1915, marked the close of another fiscal year in the history of this association. Since its organization, seven years ago, there has been a marked increase in the interest in road building throughout this general Appalachian region; but during the past year the accomplishment in actual road building has outstripped that of any previous year. We believe that much of this interest has been awakened through the work of our association in holding conventions, distributing literature through its official organ, Southern Good Roads, and through the correspondence of the President and other members of the association with county officials in connection with the passage of

bond issues, the solution of certain road problems, the promotion of Interstate and National Highways, etc.

"If our Association is to continue this active work, it is necessary for it to have not only the moral support of a big, interested membership, but financial support as well. As you know, our dues are only nominal, being \$1.00 per year. To meet the actual expenses of our conventions, correspondence, etc., it is necessary to have a large contributing membership and for those who have been members to continue their active support of the association. I am therefore going to ask you, as a loyal supporter of good roads and member of the association, to send in your dues for 1915-1916 of \$1.00. It would also be of great advantage to the Association if you could secure new members for us and interest them in our purpose of "encouraging the building and maintenance of good roads in the Southern Appalachian States."

"If each active member would secure say five new members it would increase our potential strength as an association enormously and would help us to carry on a more active campaign for better methods of road construction, maintenance, organization and administration.

"Those who live in this Southern Appalachian region have peculiar problems in road building and peculiar advantages to be achieved through the building of good roads in developing and rendering available certain natural resources; and it is these problems and mutual interest which should bind us together to bring about systems of good roads, not only in townships and counties but in the building and maintenance of great trunk lines which will make it possible for the tourists from the North and West to come to us and enjoy the attractions we have to offer. While, on the other hand, through the encouragement of this tourist trade, the people of the Southern Appalachian region would be enabled to reap a rich harvest from the splendid natural advantages with which nature has so abundantly endowed this region.

"Be not only a believer in good roads but a worker for good roads, and boost the cause by doing some work now for the Southern Appalachian Good Roads Association. Send us your dollar and get as many others to join with us as you can!

"With best wishes, I am  
Yours cordially,

JOSEPH HYDE PRATT,  
President."

#### Lincoln Highway Boosts Others.

The widespread interest that has attached to the amazing development of the Lincoln highway in the two years since the idea of its construction was given to the public is responsible for an increasing demand on the part of the people for knowledge concerning road conditions in every part of the country.

Were all the highways in the United States being developed as rapidly as the Lincoln highway, some startling figures in the way of expenditures for such improvements might be quoted. Figures which really show the expenditure for road improvement during the past year and for the past decade are just as interesting as they show the necessity for immediate constructive endeavor.

Secretary Lane has recommended to Congress that \$100,000 be appropriated toward building a road in teresting as they show the necessity for immediate constructive endeavor.

Ten years ago when the good roads movement was just beginning to enlist public support, approximately \$79,000,000 was expended by states, counties, towns and

districts in the United States in furthering the cause of improved highways.

Through the awakened appreciation of the advantages of good roads since that time, due in part to the Lincoln highway propaganda, the amount jumped to \$235,000,000 for the last year. This includes the \$4,623,800 which, in round numbers, were spent in improving the Lincoln highway.

The Lincoln highway is 3,384 miles long, while the United States has, as a whole, 2,240,000 miles of public roads, including the Lincoln highway.

In comparing these figures, it is very apparent that the Lincoln highway has received its share of attention as far as the percentage goes, but there is every reason to continue the endeavor to complete the Lincoln highway as soon as possible since it stands as the most certain example of what connected road improvement should be, for the rest of the country to follow.

However, through the interest which is centered on the construction of the Lincoln highway many similar highway organizations have come into life since its inception and public demand for good roads is becoming more and more insistent in seeing larger sums appropriated by the state and county for highway improvement.

#### Arkansas Must Hustle.

Unless Arkansas people are active, the state will lose the Jefferson Highway, to be built from Winnipeg, Can., to New Orleans, Arthur Kepner, president of the State bank of Decatur, and one of the Arkansans interested in the road, says.

"At the recent New Orleans convention of the Jefferson Highway Association Arkansas had only one delegate, and he was there only by chance," said Mr. Kepner. "Oklahoma, which is trying to secure the highway route, had 43 delegates. Missouri hopes to have the highway come through the state, and has asked Arkansas to join with her against Kausas and Oklahoma. It is up to Arkansas to wake up.

"The Jefferson Highway will be one of the greatest roads in the country, and Arkansas should not miss an opportunity to bring the route through the Ozark from Joplin, Mo., on to Fort Smith, and from there to Shreveport, La. It is estimated that this route would be 62 miles shorter than the proposed route through Oklahoma, and we can secure it if we work. There will be a meeting of those interested in securing the road in Fort Smith early in February and we hope to have a large delegation there.

"Arkansas people have not awakened to the importance of this project. The people along the Missouri route subscribed \$300,000 toward the road in a short time. Arkansas has done very little. Mr. Carter today promised that the state will aid the project through its highway engineers, but it is improbable any appropriation will be made. The road is being built by the people along the route and by popular subscriptions. Several states probably will appropriate money to help build it."

The Escambia county, Fla., commissioners have postponed the election for a million dollar road bond issue from Feb. 1 to a later date, very probably the general election in November.

The counties of Wayne, Cabell, Wyoming, Mingo, Mercer and Kanawha, in West Virginia expect to spend five and a half million dollars for good roads if all the proposed bond issues carry.

# Third North Carolina Road Institute at the University, Feb. 7-12

By Dr. JOSEPH HYDE PRATT

IT WAS REALIZED for some time by those in close touch with the road work of the State that this work was not being conducted in an efficient or economical way and therefore not to the best interests of the counties and communities. It was felt that those interested in the actual construction of the roads of the counties, whether they were engineers, superintendents, foremen or supervisors, should be brought together at some general meeting to discuss the many problems with which they had men in connection with their road work and to receive general instruction in regard to the best methods to be employed in road work so that the immense amount of money appropriated for this work would be more wisely and judiciously expended and the enormous waste of road funds, to a certain extent, checked.

The University of North Carolina became interested in this problem and joined with the North Carolina Geological and Economic Survey in holding a Road Institute at the University, March 17-19, 1914. The success and value of this first institute to those attending was expressed in the following resolution passed just before the close of his institute:

"I. Resolved, That we express our thanks and appreciation to the Departments of Civil and Highway Engineering of the University and the North Carolina Geological and Economic Survey for the benefits which we have derived from the good roads institute.

"II. Resolved, Further, That it is our belief that such an institute is of very great value to the good roads work of North Carolina, and it is also our belief and desire that the institute be made an annual occurrence, and we herewith respectfully request the president of the University and the Director of the North Carolina Geological and Economic Survey that they seriously consider the holding of an annual good roads institute at the University."

The request expressed in the resolution was considered very seriously by the president of the University and the Director of the North Carolina Geological and Economic Survey and it was finally decided to make it an annual institute.

The North Carolina State Highway Commission, which was created by the general assembly of 1915, also became interested in the work of the institute and very willingly offered to cooperate with the other two state institutions in holding this, the Third Road Institute; and therefore, the institute is now under the joint supervision of the State University, the State Highway Commission and the State Geological and Economic Survey.

It has really become the State School of Instruction for county road officials and a clearing house for the road problems of North Carolina. It is therefore of very great value for all who are connected in any way with road work throughout the state.

North Carolina is constantly increasing her road revenue and for the year 1916 there will be approximately \$5,000,000 spent in some way in connection with road work in the state. A large proportion of this has been raised by bond issues.

It is beginning to be realized more and more that in

order to obtain the best results from the expenditure of these funds the very best business management and engineering skill possible must be employed; therefore, engineers, contractors, manufacturers, highway commissioners and county road officials have been invited to attend this institute to discuss ways and means, exchange ideas and give suggestions in regard to various road problems which will be taken up for discussion. The inefficiency of any highway officials or engineer affects the interest of the people of a community and also has a decidedly adverse effect upon the general movement for better roads. For this reason, all road engineers, superintendents, foremen, contractors and commissioners should avail themselves of the opportunity to attend the road institute, not only for the benefits that they themselves may receive directly, but also for the good that they can confer upon others by giving their experiences in solving various road problems which they have had come under their direct experience or observation.

## Training for Road Engineers.

One of the great problems which confronts North Carolina today is the lack of trained men to handle the highway work and give it the careful consideration which its importance demands. There are many engineers within the state, who have achieved success in special lines of engineering, but who have not had any experience in the location or construction of roads; and therefore they cannot be classified as highway engineers and if employed as such, it is impossible for them to do justice either to their employers or to themselves. In some instances, engineers who have succeeded in other lines of engineering, have attempted highway work, with the result that the work was not either efficiently or economically done and this proved the more conclusively that such work should have been left to the experienced engineer. For some time it has been considered that road construction did not require the services of a trained man and in some instances men who have had little or no knowledge of engineering have made attempts to construct roads which have proved very costly to the community, not only in their first cost, but as a continuous expense on account of the high maintenance charges, due to improper location, alignment and drainage. Such mistakes have often been the reason why a county or community would discontinue the construction of better roads and has often prevented adjoining communities or counties from beginning road work as soon as they otherwise would have done.

A skilled engineer can very readily acquire the knowledge and experience necessary to qualify him as a highway engineer but it is not fair for a community to have to pay him for acquiring such knowledge and experience at the public's expense.

A road institute, such as is offered to the people of North Carolina, does not expect to be able to turn out experienced and efficient road engineers, but it does profess to be able to give information and instruction which will be of value and benefit to road engineers and increase the knowledge and efficiency of road superintendents, foremen, supervisors, overseers,

etc. To the commissioners, the institute offers an opportunity of familiarizing themselves with the character of the road problems which must be considered with the prospect of its bringing to them a clearer realization of the need of employing practical and experienced men to have charge of the road work in the county over which they, as commissioners, have jurisdiction. There is no question but that by bringing together the engineer, the superintendent, the foremen and supervisors, that they can through an interchange of views and experience, greatly benefit each other and it is the aim of the institute to make the lectures as practical and instructive as possible so that those attending will be in a position to give better service to their counties and communities.

The practical demonstrations that will be given in regard to maintenance or upkeep of highways, the use of various road machines, etc., will undoubtedly result in more practical and economical work being done throughout the state. The value of this work is such that it is believed any county commission will be fully justified in detailing their road superintendent, foreman and supervisors or overseers to attend the institute and appropriating enough money from the county funds to pay their expenses.

The staff of instruction includes not only men of the University but men of experience and high reputation from other states and from various counties of North

Carolina. The work will be taken up systematically and sufficient time allowed for a thorough discussion of each subject and all those in attendance are invited and urged to take part in the discussions, either by asking questions or answering them. There will be exhibits of road machinery, road materials, road models, maps, charts, etc., and there will be outdoor instruction given in methods of maintenance of roads and the use of certain road machines.

There are no fees for attending the institute and no text books are required. Certain books and pamphlets will be distributed, however, to those attending, which will give information of value regarding subjects discussed. The institute is designed to meet the needs of the road builders of North Carolina and is open to anyone who wishes to attend.

Those who desire to attend are urged to notify the director as soon as possible so that accommodations can be provided. Board and room may be secured in the village at the hotel or boarding houses at from \$1 to \$2 per day. Arrangements can be made for a certain number of rooms in the college buildings and rooms can be obtained in several of the houses in the village. Those rooming in this way can obtain their meals at Swain Hall at 15 cents each. On account of the number who expect to attend the institute, more satisfactory arrangements can be made for the comfort of the members if they will notify the Director, Joseph



Climbing to "The Land of the Sky."

Hyde Pratt, Chapel Hill, that they will attend and apply for reservations.

#### Office of Instruction.

E. K. Graham, President of the University of North Carolina.

M. H. Stacy, Dean of the College of Liberal Arts and the Professor of Civil Engineering.

Joseph Hyde Pratt, State Geologist and Director of the Road Institute.

W. S. Fallis, State Highway Engineer.

Collier Cobb, Professor Geology, University of North Carolina.

T. F. Hickerson, Associate Professor of Highway Engineering, University of North Carolina, and member of State Highway Commission.

Robert L. James, Highway Engineer and Associate Professor of Drawing, University of North Carolina.

John E. Smith, Instructor in Geology, University of North Carolina.

A. D. Williams, Chairman, State Road Bureau and Chief Road Engineer of West Virginia.

D. H. Winslow, Senior Highway Engineer in Charge of Field Maintenance of the U. S. Office of Public Roads and Rural Engineering, Washington, D. C.

R. E. Snowden, Highway Engineer of the North Carolina State Highway Commission.

D. Tucker Brown, Highway Engineer in Charge of Concrete and Bituminous Road Work in Guilford county.

W. A. McGirt, Chairman, Board of County Commissioners, New Hanover county.

R. A. Burnett, Road Superintendent of New Hanover county.

R. T. Brown, Highway Engineer in Charge of Road Construction of Davidson county.

J. B. Clingman, Highway Engineer of Madison county.

J. N. Ambler, Consulting Highway Engineer.

R. P. Coble, Highway Engineer of State Highway Commission.

H. B. Varner, President of State Penitentiary Board.

H. Moeutt, Highway Superintendent on Hickory Nut Gap Road.

James Mulligan, Superintendent of Construction of Roads in Davidson county.

John Carriekhoff, Foreman of Road Work, Davidson county.

J. R. Pennell, Road Engineer in Charge of Work in Green county.

R. G. Lassiter, Road Contractor.

Honorable John H. Small, Congressman from the First North Carolina District.

R. B. White, Franklin, N. C.

Sam D. Scott, Highway Engineer of Wayne county.

Ira B. Mullis, Highway Engineer of State Highway Commission.

Nello L. Teer, Grading Contractor.

F. R. Brown, Highway Engineer of Person county.

N. C. Hughes, Jr., Road Engineer and Superintendent of Halifax county.

Cloyd Miller, Road Superintendent in Charge of Construction of roads in Lovelady Township, Caldwell county.

John D. Waildrop, Civil Engineer, Greensboro, N. C.

Representatives from the following companies are expected to be in attendance and give practical instruction in the use of various road machines, certain surfacing materials and culverts:

The Good Roads Machinery Company, Kennett Square, Pa., Mr. Richardson, Representative.

E. F. Craven, Greensboro, N. C.

The General Utilities Company, Norfolk, Va.

Wyoming Shovel Company, C. H. Broward, Agent, Atlanta, Ga.

Smith and Sons Manufacturing Company, Kansas City, Mo.

Anstirn Brothers, Atlanta, Ga.

The Barber Asphalt Paving Company, Philadelphia, Pa.

The International Harvester Company of America, Chicago, Ill.

The Thew Automatic Shovel Company, Lorain, O.

Keystone Driller Company, Beaver Falls, Pa.

The Robeson Process Company, Pennington, N. J.

The Pomona Terra-Cotta Company, Pomona, N. C.

Southern Metal Culvert Association, G. P. Gavia, President.

The Atlas Portland Cement Company, New York City.

Universal Portland Cement Company.

#### New Highway Across Central Virginia.

A through highway from the Eastern Shore and Old Point to White Sulphur Springs was advocated at the Rural Road Improvement League held during the Road Builders' Convention. The route suggested is from Old Point Comfort and via Fortress Monroe, Yorktown, Williamsburg, Jamestown, Seven Pines and other fortifications, Richmond, Yellow Tavern, Louisa, Coblean, Charlottesville, Lexington, Staunton, Covington, Hot Springs to White Sulphur Springs. This route is 400 miles in length of which not more than fifty miles is now utterly impassable. Committees were appointed to forward the movement as follows: Eastern Shore—J. Harry Row; Hampton Roads, George F. Adams; Peninsula, N. L. Henley; Mountain road, E. N. McClure; Albemarle and Staunton, Murray Babcock; Covington and Alleghany, Senator Rinehart; Rockbridge, S. A. White, Bath, John W. Stephenson.

#### Jefferson Route in Minnesota.

The Minnesota Highway Commission has selected the route of the Jefferson Memorial highway from St. Paul to Bemidji on the route to Winnipeg. The Jefferson Highway association designated the road leading from Albert Lea to St. Paul known as the Capital National highway which passes through Owatonna, Faribault, Northfield and Farmington. The association authorizes the Minnesota Highway commission to select the rest of the route through Minnesota.

The route selected is through Osseo to Anoka, Hennepin county, to Elk River in Sherburne county, thence north on the east side of the Mississippi river to Little Falls, thence northwest to Staples in Todd county, west and north through Wadena and Park Rapids to the source of the Mississippi in Itasca state park, thence northeast to Bemidji. At this point the selection will be postponed until engineers have had an opportunity of picking out the best route from Bemidji to St. Vincent, where the highway will connect with the Canadian division.

Eastern North Carolina counties expect 1916 to be their greatest road building year. Work will be done in Jones, Duplin, New Hanover, Craven, Washington, Greene, Lenoir and other counties.

The Minnesota Highway Commission has selected the route of the Jefferson Highway from St. Paul to Bemidji, on the way to Winnipeg.

### Dixie Highway Gets Markers.

The Dixie Highway, of Chattanooga, the official organ of the Dixie Highway Commission, says: "Information just received from the manufacturers indicates that the delivery of the official Dixie highway markers will be started within the next few weeks. The designer of the marker has been successful in creating an unusually distinctive and attractive sign, which will no doubt meet with general approval all along the highway. The sign measures 10x14 inches and is handsomely embossed in colors on heavy steel (28 gauge.) The color scheme is red, white and blue, with the outside wrapping of the cotton bale in brown."

### Michigan Highway Markers.

Definite plans for the marking system to be used along the West Michigan Pike were made by the association in its meeting at Muskegon in January.

Markers will be placed a mile apart over the entire distance of the Pike except stretches of winding roads, and at corners where extra posts will be added. The markers will be constructed of reinforced concrete, and shall stand five feet above the ground. Each post will be numbered so that the tourist may by finding the corresponding number in his guide book, tell his exact location at any place along the Pike. Berrien county alone will have 74 markers.

The town of Statesville, N. C., will spend \$30,000 for street improvement, bonds having been sold last month.

Hopkins county, Texas, road district No. 1 will shortly begin the construction of 64 miles of hard surfaced roads.

### Tennessee Highway Department

"The state highway department has already proven a powerful incentive to road construction," said Hon. James Joseph Murray, secretary of the Tennessee commission and one of the most popular and widely known members of the senate of Tennessee.

Mr. Murray pointed out that the small sums going to the several counties had been the means of securing thousands of dollars for road building that would not otherwise have been obtained. In other words, it has been and is the policy of the commission to help those who will help themselves. Where a certain sum of say a couple of thousand dollars, is available for a county, it is placed on a road with the understanding and agreement that an equal sum in addition will be provided.

The department is the youngest in the state, but it has, in addition to this work, done a world of missionary labor. Under its direction much printed matter has been distributed, highway organizations have been promoted and the papers of the state liberally supplied with good roads articles.

Mingo County Commissioners, Williamson, W. Va., and Pike County, Ky., Commissioners, Pikeville, Ky., will construct bridge across Tng Fork of Big Sandy River at Williamson, connecting Mingo and Pike counties; steel superstructure; concrete substructure.

### Get Roads Out of Politics.

The taking of the road department of Baltimore county out of politics, placing it on a strictly business-like basis and the abolition of the district supervisor system and the special road fund are the important suggestions made to the County Commissioners in a report from the United States Office of Good Roads.

Several months ago a committee from the Good Roads Association of Baltimore county waited on the County Commissioners and Roads Engineer William G. Suero and requested that the commissioners ask for such a report. Representatives from the Government were sent into the county, were given free access to the records in the offices of the Commissioners and the roads engineer and visited the roads in every district in the county.

The report will help the commissioners materially in the drafting of legislation for the road department and, as it has been felt for some time that a change should be made in the present road system, the report is expected to bring this about during the present session of the legislature. The county spends about \$500,000 each year on the roads and much of this is declared to be wasted through the supervisor system.

Tyler county, Texas, voted \$100,000 more road bonds last month by a vote of more than two to one. This supplements \$300,000 bonds previously issued.

Rummels county, Texas, has four hundred miles of good roads now complete, with \$60,000 invested in steel bridges. The total upkeep cost is about \$9,000 per year.

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# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### Arkansas.

February 23 is the date set for a Jefferson Highway Convention to be held in Fort Smith, Ark., according to information given out by Arthur Hepner, a Decatur banker, who has been devoting much of his time and money the past year in the interest of the proposed international highway through the scenic Ozarks and southeast to Texarkana.

The purpose of the meeting is to organize a state-wide Jefferson Highway association, and arrangements for the convention were completed at a conference held in the Fort Smith Business Men's Club, when President Harry K. Albers, of the Fort Smith Motor Club, and George Sengel, one of the Arkansas directors of the International Jefferson Highway Association, discussed the matter.

It is expected there will be several hundred delegates to the meeting next month as the subject is of live interest and importance to western and southern Arkansas.

There are two routes open for this highway to penetrate, both of which lead out from Waldron, the county seat of Scott county. The first one is from that town to Mena, a very mountainous road, and thence south to Texarkana, via DeQueen and Ashdown; while the alternate would be from Waldron to Mount Ida, Murfreesboro, Hope and Texarkana.

Due to the great importance of this highway, which will approximate in importance the celebrated Santa Fe trail, there will be a live contest for it by other states.

\* \* \*

### Colorado.

Probably no good road meeting in recent years attracted as much interest throughout the entire state as the convention of the Colorado Good Roads Association, held in Denver on January 19 and 20.

In addition to the Colorado Good Roads Association meeting, annual meetings were held by other road organizations of the state, included in which are the Colorado division of the Pikes Peak to Ocean Highway, of which J. K. Rouse of Burlington, Colorado is president, and the Spanish Trail Association of which J. H. Jenkins of Pueblo is president. The last association is working to secure a good highway throughout southwestern Colorado which will connect with the roads to southern Colorado.

The principal topic for discussion at the convention of the Colorado Good Roads Association was the construction and maintenance of roads. This year will see the expenditure of between \$2,000,000 and \$3,000,000 on the highways in Colorado, and the question of how best to secure the greatest results is therefore of much importance.

The speakers included many of the most prominent men in the state.

\* \* \*

### Florida.

James R. Murphy, of Palatka, Fla., who is a good roads enthusiast and one of the big factors in the good

roads movement in Florida recently told the Boston folks of road progress in his state.

"We are certainly building good roads in Florida," said Mr. Murphy, "and we will soon have the state gridironed with them. Within two or three years there will not be a point of interest in the whole state which the automobilists cannot reach on a good, hard, smooth, surfaced road.

"Brick has been the favorite material for those communities that can afford it, but sand asphalt is making rapid headway. The cost is less than half of that of brick, and the sand can be had alongside the roads in any part of the state.

"Last year Florida built 2,848 miles of good roads at a cost of more than \$10,000,000. Half of the roads were surfaced with sand clay, 857 miles with marl or crushed stone, and eighty-five miles with brick.

"Palatka is the center of the good roads movement, as it is the hub of traffic for the state of Florida and

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the most direct route from Jacksonville and northern Florida to all points on the east and west coasts.

"The Jacksonville-Tampa Scenic Highway is routed through Greencove Springs to Palatka.

"The Dixie Highway runs via St. Augustine and Hastings, and Palatka has just voted bonds for brick road bringing it through East Palatka into Palatka.

"The connecting link of the east and west loop of the Dixie Highway from Gainesville will go through East Palatka to Hastings.

"It has been officially recommended that the Florida extension of the National Highway from Valdosta, Ga., be extended direct to Palatka. This is called the Suwannee river automobile route to Florida. It is already passable, but is not yet hard surfaced. At a meeting held this month at White Springs, representatives of all the counties through which it passes were gathered 2000 strong and pledged themselves to build hard roads. This is the most direct highway to Florida from all points in the East and the South.

"This gives Florida three lines from the North and one each from the West, East and South.

"At a meeting held last week at Rodman, Fla., it was decided to build a hard road, probably sand asphalt, from Palatka to Orange Springs, the county line of Putnam county.

"Orange Springs is one of the oldest and best known health resorts for the residents of Florida, but for a long while lacked the railroad facilities which it has now. It is soon to have a modern hotel, a sanitarium, water works, electric lights, and every facility of an up-to-date community. It is right in the center of the best hunting and fishing territory in Florida, the famous Ocklawaha River Valley, which is a sportsman's paradise.

"Marion county has started a movement to hard surface this road from Orange Springs to Ocala, as it is part of the most direct route from Jacksonville to Tampa.

"Yes, sir, Florida takes the blue ribbon for road building in proportion to population. She has already expended \$8,000,000 in good roads, and in the last year has voted to expend \$3,000,000 more."

\* \* \*

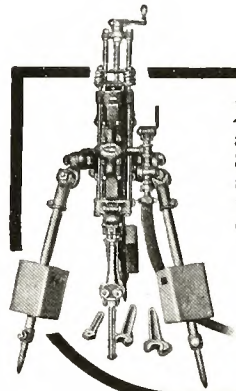
#### Illinois.

Close to \$25,000,000 may be spent on good roads for Illinois if the bond issues now under contemplated in more than twenty counties are approved by the votes of the people.

In his call for a special session of the legislature Governor Dunne included as one of the subjects to be considered by the lawmakers a bill validating the \$2,000,000 Cook county road bond issue. This was voted by the people, but the bonds cannot be sold because a question has been raised concerning the meaning of the act. There is no question about the bill passing both senate and house once it comes before them.

Cook county's \$2,000,000 would be the largest amount to be spent in any one county, but reports received in the offices of the state highway commission show counties of much less bonding power and having a great deal smaller assessed property valuation are contemplating spending far more money in proportion.

In Sangamon and St. Clair counties they are talking about voting \$1,500,000 in road bonds. Kane, Will, Winnebago and La Salle counties are talking in the same figures. Iroquois county is considering an issue of \$1,250,000, while Dekalb, Rock Island and Lake



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### The Barber Asphalt Paving Co.

Philadelphia, Pa.

counties regard \$1,000,000 as sufficient. Dupage, Edgar, Adams and Shelby counties would spend \$750,000, and there are ten others which contemplate devoting not less than \$150,000 for road purposes.

Cook county's total assessed property valuation is \$1,078,845,484 and its total bonding power \$53,342,724. In showing how nobly the counties outside of Cook are responding to the daily increasing demand for good roads, the following figures are given by the state commission from counties where there is agitation for bond issues of more than \$1,000,000.

Dekalb, valuation, \$19,447,095; bonding power, \$972,355. Iroquois, valuation, \$27,668,655; bonding power \$1,383,433. Kane valuation, \$45,964,687; bonding power, \$1,798,234. Lake, valuation \$23,540,718; bonding power, \$1,177,036. La Salle, valuation, \$6,767,532; bonding power, \$1,838,379. Livingston valuation, \$29,287,912 bonding power, \$1,464,396. Rock Island, valuation, \$22,059,341; bonding power, \$1,102,967. Sangamon, valuation, \$41,345,039; bonding power, \$2,067,253. St. Clair, valuation \$35,032,546; bonding power, \$1,751,627. Will valuation, \$33,643,717; bonding power \$1,682,186. Winnebago, valuation \$33,761,839; bonding power, \$1,688,092.

These figures are interesting to the good road advocates in that they show a tendency in small counties where the bonding power is fifty or more times less than that of Cook to spend almost as much money as the people of the big county have voted.

Elections at which these proposed bond issues will be voted will be held in many of the counties next spring or fall, while others cannot be held until 1917 or 1918.

\* \* \*

#### Kentucky.

The annual meeting of the Kentucky Good Roads Association, held in Louisville last month, took the following steps for additional road legislation:

That the coming legislature pass an act in accordance with the constitutional amendment permitting convict labor on the roads; a recommendation of a constitutional amendment permitting counties to increase their tax levies for the purpose of building roads; a recommendation of a "wide tire" act, which limits the weight of the load on narrow tires, and a request that a committee of five be appointed by Col. McBryde to consider any suggestions for road laws that might be made during the course of the meeting of the next legislature, and to remain in Frankford to support in any proper manner such road legislation as it would deem advisable.

The press of Greensboro and High Point, North Carolina, are urging that the concrete road between these cities be finished now, instead of two miles at a time, as first planned. The road is costing about ten thousand dollars per mile.

The court of appeals at Galveston having upheld the \$190,000 bond issue, work will begin right away on the good roads system around Beaumont, Texas.

Lincoln county, Miss., citizens want to build 120 miles more of gravel roads. \$200,000 has already been spent on this type of highway.

Counties on the Dixie Highway have spent \$1,765,200 in the past six months and expect to spend \$6,951,000 during the year 1916.



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How much more money would you make for yourself or for your community if you found a way to cut 25 per cent off your present cost of grading roads? If you are still using horse or mule power, we can show you a way to save even more than that. If you are using a gasoline tractor, we can still show you how to make a profitable saving.

Every dollar you cut the cost of road grading is a dollar added to your net profit. We can put you in touch with one man who says he cut the cost of road grading in Louisiana from \$26 per mile with mule power to \$4.50 per mile with Mogul kerosene tractor power. His figures are in the official records of his parish.

That is probably an extreme case, but the fact that so large a saving as this could be made, is interesting. It suggests that possibly your costs are higher than they need be. Perhaps a little investigation would pay. Would you like to see some of the figures we have collected—some of the savings we have helped other contractors and road builders to make by changing over to Mogul or Titan kerosene tractor power? They'll cost you nothing but a two cent stamp and a little time. Write for them.

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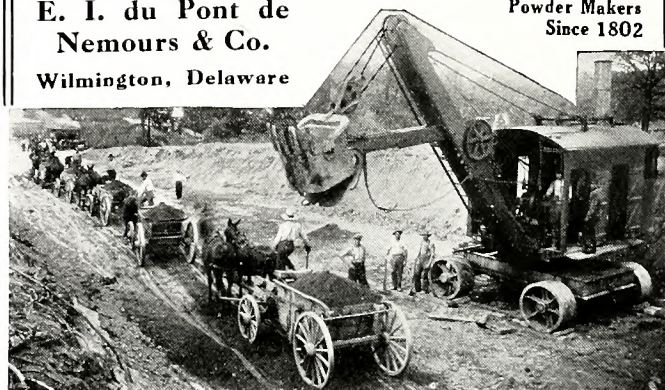
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# SOUTHERN GOOD ROADS

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## An Important Quality of Wood For Paving Purposes

By MAJOR W. W. CROSBY

Chief Engineer Maryland Geological and Economic Survey and  
Consulting Engineer, Baltimore, Md.

NOT so many years ago, it was a common practice in paving specifications to call for or describe some of the materials by their trade names, and, for the purpose of avoiding the creation of a monopoly or of an embarrassing situation by such a specification, to append to such a description the alternative clause "or other material equally good in the opinion of the engineer." Frequently, however, such an alternate created another situation equally embarrassing and the indefiniteness and unscientific character of the clauses were generally recognized. Then the effort was made to determine and describe the essential characteristics of a material known by experience to be satisfactory for the purpose for which it was intended to be used, and by such description in the specifications, to insure the delivery of a material regardless of its name which would be sufficiently like the particular material in question to be satisfactory to the highway authority and the needs of the occasion. Such a course also seemed to offer a more rational method for the engineer, or other referee under the contract, to convince everyone of the equalities or inequalities of the materials offered.

Quite naturally perhaps, engineers, who have become accustomed to the use of a particular brand of material, felt obliged, in abandoning the use of the brand as a means of description of the material desired, to be on the safe side in their substitution of a more technical description, and often they were assisted along the lines of this tendency by their chemical or other advisers, particularly when none of the parties could be positive as to just what elements entered into the production of certain facts, apparently considerable, in the use of the material for the specific purposes of paving.

For instance, take the case of bituminous materials—up to six or seven years ago, but few such materials were generally on the market, their characteristics were fairly well known, and their specification was usually by a trade name as at first described, according to the personal views and experiences of the engineer in character of any particular case. Quite suddenly, there was a demand for similar materials differing in many respects from the common products referred to, and this demand was met by a prompt supply of greatly varying materials from both the older sources of supply and from newly developed ones. The accurate de-

scription of just what was wanted in any particular case was necessary, and the insufficiency, as well as the impropriety of the older method of description became evident. Thereupon, detailed descriptions of the various materials were put forth. Many of them were so complicated as to be objectionable for many reasons. The simplifications of these complex descriptions, when attempted, was found sometimes to be difficult because of the lack of knowledge as to the effect that would be brought about by the omission or condensation of some of the clauses. There may often have been a resistance to simplification brought about by the realization of the want of definite knowledge of many points and by the desire to accelerate research work and the accumulation of definite knowledge through the opportunity offered by such specifications.

Perhaps the first important instance of departure from the older form to a more rational form of specification for a material was in the case of hydraulic cement. Here, a relatively simple compound had to be described, and it was quickly settled that a few physical tests supplemented by one or two chemical ones were all that was necessary to insure the delivery of a proper article. There may still be some question as to the necessity for all the tests now commonly required on this material, but in the main its description has been satisfactorily standardized.

The same general lines of action appears to have been, or to be being followed with many others of the paving materials in use. The main objects of this paper are to call attention to the lagging behind, in some respects at least, and as it appears to the writer, in the case of specifications of wood blocks for paving purposes and to suggest for consideration and discussion among those interested, the possibility of a considerable improvement in the now customary specifications for this material.

The specifications for wood blocks have generally to date prescribed that the material should be "long leaf yellow pine" (*pinus palustris*) or other wood equal thereto in the opinion of the engineer (with occasionally an alternate wood mentioned by name); that the growth rings should be in number between certain limits per inch, and that the blocks should be within a certain maximum limit of variation from size, percentage of

knots, cheeks and other defects. It is of course also prescribed that they shall be treated with a preservative whose characteristics and use are described more or less carefully, but for the purpose of this paper, the discussion will be confined to the specifications referring to the description of the wood itself.

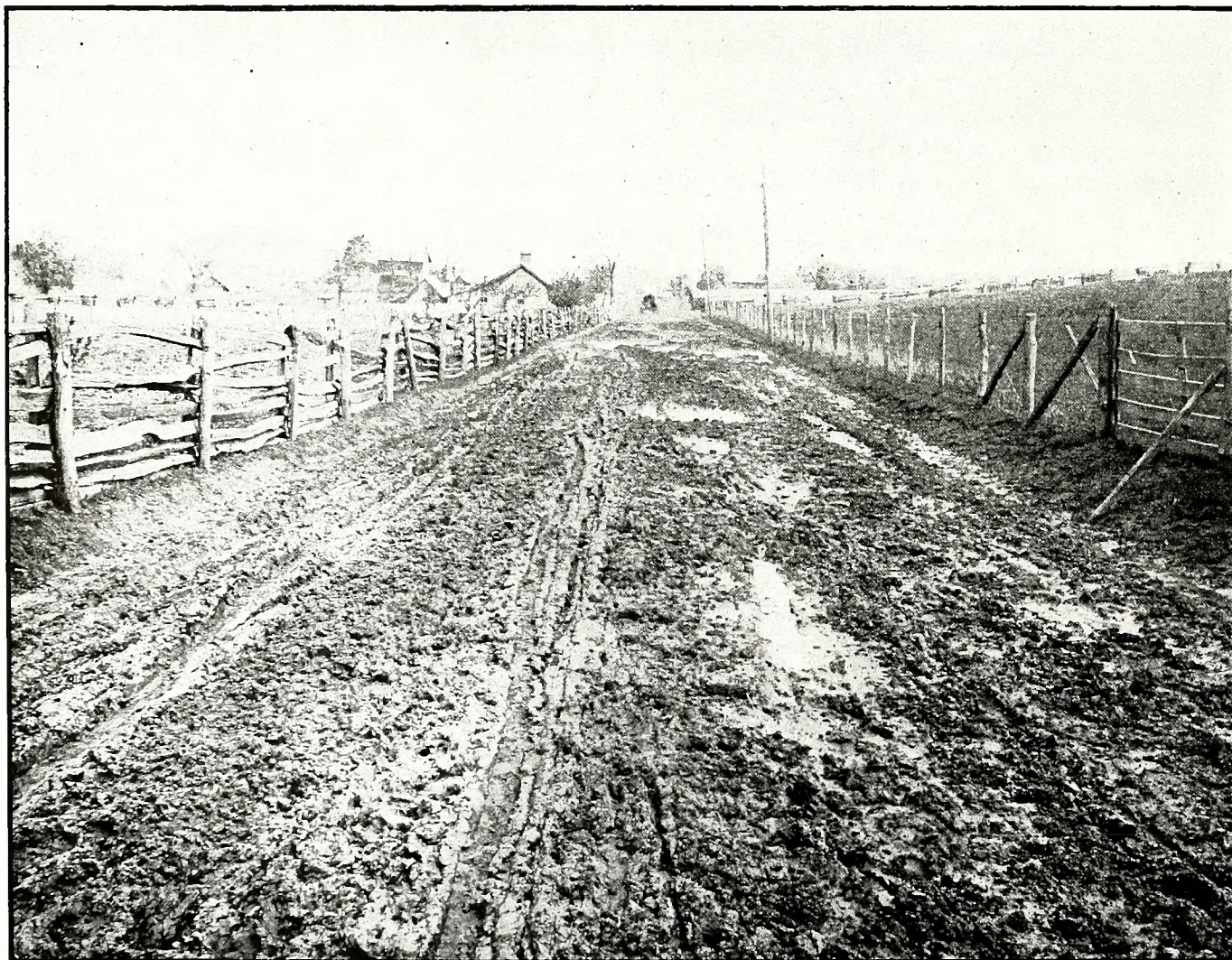
#### Improve on Specifications.

It seems to the writer that, exactly as in the cases of hydraulic cement and of bituminous materials, it is not only entirely possible to improve on these specifications for the wood to be used, but also that it is extremely desirable, for many reasons, that this should be done. He proposes to suggest one way in which he thinks the end may be reached.

The object of the old specifications naming the wood to be used and describing limits for the variation of this particular wood, seems to have been to secure a grade of material which it was felt experience had demonstrated would be capable of proper impregnation by a preservative and when so impregnated by the preservative and laid in the roadway, would be neither too soft to wear objectionably, nor too hard ordinarily to be slippery under traffic. Now, may not both of these ends be secured by a single specification which shall properly describe and place limits to a quality of wood, which, for want of a better term, the writer will call its "consistency." Perhaps the term resiliency would be more accurate, but there may be some discussion on

this point, and as authorities do not seem to be agreed as to a definition and measure of the resiliency of wood, the somewhat broader term—consistency—seems to the writer more satisfactory for the present.

The writer believes that an assumption may be made here to the effect that, under the same conditions as to preservative and treatment, the harder the wood, the less of the preservative absorbed and vice versa, also, that hardness and softness are merely colloquial expressions for degrees of consistency, purely relative and by no means definite. Again the writer thinks it will be generally agreed that an extremely hard wood paving block is likely to prove objectionably slippery in the roadway, while too soft a block does not show sufficient resistance to wear, and that a desirable block is one which will come, in consistency—that is, in hardness or softness of wood—somewhere between the limits of the hardest permissible without slipperiness and the softest permissible without excessive wear. It is therefore a measure of hardness or softness—that is, of consistency—which will determine the kind of wood to be permitted for use in any case, and if a means for measuring this consistency and a scale of consistency shall be adopted, there will then be no further need for naming the kind of wood to be used, and quite probably no need of going into detail in the specifications concerning the number of rings to the inch in the different kinds of wood. The resulting specifications



Johnson City, Tennessee, Road, Before Improvement



Johnson City, Tennessee, Road, After Improvement

will therefore be less subject to criticism on the grounds of containing too large a personal factor, of being too indefinite, or of being unnecessarily narrow and "closed," such as is the case when it is stated that another kind of wood than that specified will be accepted if "equal in the opinion of the engineer," or when a single kind of wood is specified, or when the count of rings is limited too narrowly.

Some attempts have been made along different lines toward establishing a measure of consistency. The U. S. Forest Service has done some research work and published some conclusions along this line. The Case School of Applied Science, Cleveland, Ohio, has also had some work done under its supervision along related lines.

The writer's opinion as to the general value of a consistency test on paving materials has been perhaps sufficiently set forth in his paper on "The Consistency of Bituminous Materials" printed in *Engineering and the Survey* (London) for March 7th, 1913, page 425, to need no repetition here. Those interested to secure it in detail may do so by referring to the publications just given. The writer would say that generally the remarks there may, he believes, apply equally well to wood when the necessary changes in substantives are made.

Considering now a consistency test for wood and referring to the above mentioned work of the U. S. Forest Service, it will be found that this Bureau in its Circular 38 (revised), entitled "Instructions to Engineers of Timber Tests," refers on pages 22 and 23, to certain tests for compression, and again on page 24, to an impact test. The latter test is used to determine the relative brittleness of different woods. In a circular (No. 213) subsequently issued by the Bureau on "The Mechanical Properties of Woods Grown in the United States," is given a table on the results of a number of tests included in which is a test for hardness, and the

figures given under the head of this test are stated to be those of the load in pounds "required to imbed a 0.444 inch ball to one-half its diameter." In the same table are also given figures for the results of the compression test and the impact test, which it should probably be stated now is the bending under impact and not the rebound of the impacting tool. None of these tests seems to the writer to measure directly the quality of the writer to measure directly the quality of the wood he has in mind—that is, its resiliency or consistency—though perhaps they all, more or less indirectly, throw some light on this quality, and the results of these tests may in some cases be more or less directly related to the results which would be secured from a more direct test of this quality. Under the impact test, and up to the point where permanent deflection takes place, it might be said that the resiliency of the wood—that is, the ability of the wood to return to its normal position after distortion, was indicated, but this ability in a beam may be quite different from the ability of a portion of the area of the wood to resist displacement or to return after displacement. With wood paving block, which seldom, if ever, are obliged to act as beams, it is the resiliency of a small area which is critical.

The hardness test is described by the Forest Service as the measurement of the force required to produce a definite amount of displacement of the wood fibres. This is not the critical feature in wood paving block. With them, it is rather the ability to resist displacement or for the fibres to react and to return to their normal position after a strain tending toward displacement has been undergone by them. Perhaps a slight modification of the hardness test described might answer the purpose. That is, if the steel ball (or a cube) should be loaded with a specific weight less than that required in any case to produce permanent displacement of the fibres, and the application of the force

made for a definite period, the maximum displacement being measured at the end of that period while the force was still applied, and then the force removed and the amount of restoration, toward their original position, of the wood fibres measured by determining the difference in position of the ball or cube before and after the removal of the force, the end desired would be reached, and the elasticity, resiliency or consistency of the wood thus determined in a way which would throw considerable light on its suitability for use as a paving block.

The writer is not aware of how much research work along this line may have been done, but he hopes that it is considerably more than his knowledge at present covers. It is with a view to bringing out such information as is available along this line, as well as for perhaps suggesting an investigation of value in this connection, that he submits this paper.

Reference has been made to the desirability of securing a wood which would be capable of proper impregnation by a preservative and it may seem that in the foregoing, too much consideration has been given to the consistency of the wood alone and that this matter of impregnation has been neglected. When a specific test for consistency shall be developed, the writer hopes that it will be found that the capacity of a wood to absorb the preservative is related to its consistency within the limits of the latter suitable for specification in the cases of wood pavements. He admits that the information on this point in his possession is incomplete at present. Whether or not, however, the fact hoped for shall be established need not interfere with the establishment of a proper test for the consistency because this having been established, it will then at most only be necessary to supplement it with another determination as to the capability of the wood for absorbing the preservative.

#### Prisoners on Kansas Roads.

Kansas is to allow one day out of every three off the sentence of every prisoner who labors faithfully and cheerfully upon the public roads. Road work is to be organized at once, and the plan has the enthusiastic support of J. K. Coddling, the warden, who in former years did much to better the condition of Kansas prisoners and who has just been reappointed to office by Governor Capper.

Warden Coddling is a firm believer in the opportunity afforded the convict in road work, and he was instrumental in securing the passage of the bill providing for the extra good time allowance for road work. He has written the National Committee on Prisons that the proposition is to furnish twenty-five men and one of the penitentiary officers to superintend the work and establish the road camps.

The municipality for which the work is done is to pay the state \$1.00 per day per prisoner. About 50 cents per day will be used in feeding and caring for the prisoner and the other 50 cents will be paid the prisoner or his family. The wage, together with the time off for good conduct, is an evidence that Kansas is to organize the road work in a way which will secure the cooperation of the prisoners towards making it a success.

The National Committee on Prisons hopes that cooperation between the State Highway department and State prison department will be worked out as in West Virginia and Ohio. Kansas would then reap the full benefit from the experiment of placing her prisoners out on the roads.

#### Many Favor Adamson Bill.

Evidence accumulates that the Adamson bill will find a generous support in Congress, to an extent that will insure its passage within the next few weeks.

Briefly this measure championed by the American Automobile Association provides that a home state registration number will take its possessor to all parts of the United States for whatever period the motorist may elect. Representative William C. Adamson, of Georgia, who fathers the bill, is the chairman of the Committee on Interstate and Foreign Commerce, and he has received assurances of approval from members who hail from all parts of the country.

Senator Dupont and Representative Miller of Delaware have no hesitancy in going on record in favor of the bill.

Senator Nelson of Minnesota informs his motoring constituents that he does not know of any reason why he should not favor the measure, and Representative Van Dyke comments that he has read the bill and is quite willing to vote for it.

Representative Kreider of Pennsylvania says that he is heartily in favor, and Representative Bailey of the same state expresses full sympathy with a plan which seeks to make the interstate use of automobiles less vexatious than it is under present practices.

Representative Sparkman of Florida thinks the measure timely and says that he will support it.

Representative Pratt of New York considers the proposed legislation entirely proper, for it only duplicates the attitude of the Empire State, which offers reciprocity to all other states for 365 days or any part of the year.

Representative Sherwood of Ohio believes in the merit of the bill and thinks it should become a law.

Representative Stephens of Nebraska says that the bill will have his favorable consideration.

Representatives Foss and Sterling of Illinois express similar sentiments.

Representatives Sutherland and Neely of West Virginia both realize the value of undisturbed interstate road commerce.

Senator Gallinger of New Hampshire is not aware of any argument against the measure which would interfere with his support of it, and Representative Sulloway of the same state believes in reciprocity which is "reasonable and equitable."

In view of the fact that New York and Vermont favor year round reciprocity, it is assured that the spokesmen of those two states in Congress will be unanimous in their support of the measure. New York thus would be able to supply 43 votes for the bill, to which the Green Mountain state would add two more.

It would not be unreasonable to assume that the Senate would be likely to accept the approval of the House, in view of the fact that this legislation now has a country-wide application because of the astounding increases of self-propelled vehicles until nearly two and one-half millions are now using the highways and by-ways in the transportation of commodities and passengers.

The Buncombe county, N. C., road commissioners, with the aid of citizens along the route, will build a fine highway from Ridgecrest, at the top of the Blue Ridge, to Asheville. This route will be part of the North Carolina Central Highway from Morehead City, on the Atlantic Coast, to Paint Rock, on the Tennessee line.

# Road Development in Piedmont Carolina

By E. E. WITHERSPOON

**P**ROBABLY no more significant road construction and plans are taking place anywhere in the South, than that of the Piedmont section of North Carolina. While these plans primarily effect the formation of county road systems, they have grown into sectional, state and national importance. Practically all of the Piedmont counties now have systems of good roads, or have the same in process of construction.

The county commissioners of Guilford have just borrowed \$125,000 to be expended at once toward the completion of the fifteen-mile concrete road from Greensboro to High Point. About four miles of this road has already been built by these two cities, but their plans only contemplated a few miles each year. As it is now the whole work will be rushed to completion and the National Highway tourist will find here one of the finest pieces of work in the United States. It is estimated that the road will cost upwards of \$12,000 per mile. Guilford has abandoned the macadam types of road and are building top soil roads in other vicinities.

One of the newest of these topsoil roads forms an important link in what will be a delightful sidetrip for the tourist who comes South, or for the Southern tourist starting northward. This is from High Point in the direction of Asheboro. Randolph county has graded its part of the road to the Guilford county line and is now engaged in putting on a surface of white gravel,

crushed from flint rocks. The new roadbed is going to be of almost snowy whiteness. Add to this the natural beauty of the country penetrated, and the tourist will find himself in a veritable paradise. Almost the entire 24 miles of this road is through a semi-mountainous country and one that is in process of wonderful agricultural development. The Randolph road builders are using lots of good sense in their methods. They cannot get all the gravel on at once. However, they do not want part of the road to become impassable while the other part is being made smooth as a floor, so the places that would be affected most by wet weather are being graveled first. The nature of the soil through which the grade runs make it capable of easy maintenance in its natural state. The road drag has followed the graders and even in the middle of February the entire road is in fine condition for all sorts of traffic.

## Randolph Has The Idea.

Randolph has taken a long step in the right direction. Where public funds could not be readily secured, the citizens who live along the road have liberally subscribed and begun work, rather than wait until later and pay the mud interest while waiting. Another road they have recently completed is a 22-mile stretch of top-soil road from Asheboro to Denton, in Davidson county. This road, while a new one, has been kept in fine condition through the winter by using the road



A County Chain Gang at Work.

drag freely. Thousands of wagons heavily loaded with cross ties and various kinds of logs and lumber have gone over this highway in the past few months with a minimum amount of damage.

From Denton to Lexington a fine top-soil road will be complete before the summer is over. A portion of this road is now being built, a link from Healing Springs to Healing Springs station, about three miles, having already been graded. The road from Lexington to Healing Springs has already been ordered built and work will shortly be in full swing. When this is completed it will form a circle extending from Lexington to Denton, Asheboro, High Point, Thomasville and back to Lexington, about ninety miles of fine road, and will make an elegant afternoon's drive for the pleasure seeker. Two bridges on the National Highway between Thomasville and Lexington have been delayed several months because of inability to secure a shipment of steel that was hung up in a congestion of freight. Much inconvenience to travel resulted, because of bad detours at these points. However, the bridges have just been completed and the way is now open. A toll bridge over the Yadkin River between Davidson and Rowan will likely be purchased at an early date and be made free. A movement was set on foot last month in Salisbury to secure funds to this end.

#### **Knitting Sections Together.**

The road from Lexington to Denton not only will serve as a connecting link with Randolph roads and form the ninety-mile circle, but it will be a major portion of the Lexington-Badlin road. It is now planned to extend from Healing Springs, through Montgomery county to the Yadkin River. Here the road would be taken across the river on a bridge supported by piers resting upon the abandoned five million dollar dam built several years ago by the Whitney interests. It would then skirt the 6,000-acre lake to be created by the back water from the dam of the Aluminum Company of America in the Narrows of the Yadkin, finding its objective point at Yadkin Narrows, the new city growing up around the 20-million dollar development under way there. This road would furnish a most interesting side trip for tourists along the National Highway, turning off at Lexington if going southward. A big good roads meeting of enthusiasts from Stanly, Davidson, Moore, Montgomery, Rowan, Mecklenburg and other counties was held in Albemarle March 9th for the purpose of building a connecting link to complete the Pinehurst-Charlotte road. This road would furnish connections with roads from the coastal sections, as well as from the mountains and would give another across-the-state route. Its eastern connection would also lead off from the Atlantic Highway and give another diversified route for Florida motor tourists.

Salisbury business men are interesting themselves in a good road from that city to Albemarle and Yadkin Narrows and have recently held meetings looking to the completion of links that would give a surfaced highway between these places.

#### **Forsyth Is Active.**

Forsyth county is also active in road building and has taken steps to link up with good roads built and building in Yadkin county. Forsyth roads will also soon be linked up with a road now being built north from Lexington to the county line. This will fill in an important link of the National route leading up through Roanoke, Va., and up the Shenandoah valley to Hagerstown, Md. Davidson county is now building a road

from Lexington to the Yadkin River at Yadkin College, where it will meet the good roads of Davie county and form an intersection with the government post road from Statesville to Winston-Salem. This extension is given prominence by reason of the fact that it is expected to be a part of the Boone Highway. If it is so selected, there is expected to be no hitch about building a bridge over the Yadkin here to take place of the ferry now in use.

Thus Piedmont North Carolina is coming to the front with one of the most comprehensive road systems in the entire South and is shortly going to be a real paradise for the pleasure-seeking motorist. Iredell, Mecklenburg, Gaston, Cleveland and Rutherford counties now have good highways to almost every section and these counties are hitched on to each other more firmly than ever through improved roads. Within a few months the tourist can ride hundreds of miles through this fine country without ever touching a muddy or rough road, then pass through the gaps of the Blue Ridge at Ridgecrest or Hickory Nut Gap and pass on to Tennessee and the plains of the West, or veer Southward to the land of the palmetto and palm.

#### **State Aid to Knox County.**

A. M. Nelson, engineer for the Tennessee highway commission, and J. J. Murray, secretary of the commission, were in Knoxville recently to confer with members of the Knox county, Tenn., roads commission in regard to the designation and state aid for seven proposed state roads in Knox county. More than \$8,000, Knox county's share of the automobile license fee, will be available for use on highways to be designated as "state roads" in Knox county. The seven proposed roads to receive state aid, according to Jno. L. Callaway, clerk of the Knox county road commission, are: Rutledge pike, Maryville pike, Sevierville pike, Kingston pike, Broadway pike, Clinton pike, and Central avenue pike. The work to be done on the "state roads" will be under the supervision of the Tennessee highway commission and Knox county road commission. R. O. Gallahar, engineer for the Knox county road commission, and Knox county road commission.

#### **Minnesota Funds Allotted.**

The allotment of the state road and bridge fund, amounting to about \$1,500,000, to the counties of the state, was made by the Minnesota State Highway Commission at a meeting March 7.

According to the state law every county must have allotted to it at least 1 per cent of the fund and the maximum allotment for any one county is 3 per cent. Since the three largest counties contribute about 50 per cent of the fund it is usual to allot nearly the maximum to Ramsey, Hennepin and St. Louis counties and some of the others which contribute much more than 1 per cent, generally get back what they pay in.

If this custom is followed this year the commission will not have more than 4 or at most 5 per cent of the fund to distribute among the other counties of the state over and above the minimum.

A bill has been introduced into the New Jersey legislature providing for a referendum on the question of voting seven million dollars in state bonds for road construction. The state now has no bonded indebtedness. The bonds would be paid off with the auto license tax, registration fees, fines and penalties.

# A Talk on Maintenance

By H. C. SHIRLEY

Chief Engineer, Maryland State Roads Commission

**M**AINTENANCE can be divided into two heads: 1st: Continuous maintenance—which includes the patrol system, gang system, and combination patrol and gang system. 2nd: Oiling—which is done either once or twice a year.

Where the patrol system is used, the patrolman has charge of from 4 to 8 miles of road, the length of section depending on the type of construction, and the amount and intensity of traffic. Near cities or towns where the traffic is heavy, the patrolman's section is shorter and comprises about 4 miles of road, whereas, in sparsely settled sections he can take care of from 5 to 8 miles of road.

The patrolman is supplied with the necessary small tools, namely, a mattock, pick, shovel, steel wheelbarrow, a concrete rammer, scythe, tar pot, red flag, and a cap on which is written in gilt letters "STATE PATROLMAN." He is also furnished with a number which he wears on his left arm, and by which he is known and which makes it possible for the travelling public or those living in the community to report to the State Roads Commission that patrolman number so and so is not making the proper repairs adjacent to their respective properties, is not on his job, or is not attending strictly to his duties.

It is the patrolman's duty to carry out the following instructions, which are furnished him in printed form:

First—Patrolmen will be furnished with tools, a cap, a number, and a red flag, as well as daily report cards, payrolls, and traffic reports.

The cap and number are to be worn by the patrolman at all times when on duty, the number being placed on the left arm.

The flag is to be set up on the roadside so as to be seen from the road at the point where the patrolman is working whenever he is on duty.

Second—Patrolmen are to work———hours per day, being at the place they are to begin work at——— A. M. They must work every week day, weather permitting.

Patrolmen are to walk over the entire length of their section to repair anything needing immediate attention at least twice a week and after each heavy rain or snow storm. A trip made after a rain may count as one trip in any one week.

Third—Patrolmen are expected to keep all ditches, culverts, and under drain inlets and outlets open at all times. The shoulders are to be kept to the proper grade and any wash-outs or large wheel-ruts are to be filled immediately keeping the shoulder in good line. All grass is to be kept close cut on the shoulder and slopes.

Fourth—Patrolmen shall pay particular attention to the surfacing on their roads and patch any places which are bare or loose. These patches shall be made as instructed by the resident engineer who the patrolman shall notify when patching is required.

## Patrolman Makes Reports.

Fifth—A daily report card is to be made up, using pen and ink, and mailed each day showing the date, the name of the patrolman, and helpers if any, the number of hours made by each and the station number

of the culvert near which the work was done, all in their proper space on the card.

At the end of each day the patrolman shall enter upon the expense sheet or payroll supplied for this purpose, the time for themselves and any other help or teams with which they may be furnished. On the nights of the 15th and the first of each month they shall forward to the office of the resident engineer their expense sheet made out as explained for the one-half month immediately preceding. At no time shall the patrolman engage help or teams without having first received the permission of the resident engineer.

At least once each month the patrolmen shall take an accurate account of the traffic of all kinds passing over the road in their charge and shall enter this information on the blanks furnished for this purpose and mail same to the office of the resident engineer.

Sixth—Whenever a traction engine having sharp cleats passes over the road, the patrolman shall report it by letter to the resident engineer, giving the name of the owner of traction engine, the day and the hour on which the engine was seen on the road, as well as the name of any witnesses seeing the engine on the road. The patrolman should also report the point at which the engine came on to the road and where it left.

Seventh—If any person or corporation digs or places any obstructions whatsoever on the section of road under their charge, including the piling of lumber within the limits of the roadway as well as the placing of obstructions in culverts or waterways, the placing or removing of any structures such as gas mains, water mains, telephone poles, track structures, fences, etc., the patrolman will ask such parties to show their permits from the State Roads Commission for doing the work. Should no permit be produced the patrolman shall notify the parties to discontinue work. Should the work not be immediately discontinued, the patrolman shall at once swear out a warrant for the parties trespassing and demand of the magistrate the immediate arrest of the parties for violation of "Laws of Maryland, Chapter 141, Section 32-E, Acts of 1908. In any case the Resident Engineer shall be notified as promptly as possible by calling phone No.———.

Tenth—In no case shall the patrolman contract or pay any State Roads Commission's bills. Should it be necessary to purchase any material, tools, etc., the patrolman will write to the Resident Engineer and secure a written order for same. All bills must be made out to the State Roads Commission.

Eleventh—If at any time any patrolman is found turning in time on their reports in excess of what they actually spent on their road they will be immediately removed from the work. In case of dismissal or resignation of any patrolman, he shall immediately turn over to the Resident Engineer all supplies, tools, material, etc., furnished him by the State Roads Commission. For all material, tools, supplies, etc., not returned and for which a good account cannot be given, an amount of money equal in value to the missing articles shall be deducted from any wages due the patrolman at the time of his dismissal.

Twelfth—Patrolmen shall act at all times under instructions given by the Resident Engineer.

The patrolman places the red flag on the section of road on which he is working, and when the resident engineer or inspector who pass over the road see the flag they know what the patrolman is at work in that vicinity. However, if they do not see the flag or the patrolman, he (the patrolman) is not allowed for that day's work. Also, if the patrolman finds it necessary to leave the road for any purpose, he places the flag at the point at which he left the road, and when the inspector or resident engineer see the flag at this point he knows that the patrolman is somewhere in that vicinity and credits him with that day's work.

#### How to Select Good Men.

The following method is pursued in the selection of patrolmen:

While the road is being built the resident engineer instructs the inspector to carefully observe the men working for the contractor, and if he sees any man, who lives in that vicinity, who is industrious and painstaking, and seems to understand road building pretty well, just before the contract is completed he is offered the position of patrolman to take care of that section of road when it is completed and turned over to the State Roads Commission for maintenance.

In this way, it is possible for us to secure men who understand the conditions under which the road was built, and who are more competent in every way. The patrolman reports to the resident engineer and the resident engineer reports direct to the chief engineer.

The daily report cards with which the patrolman are supplied inform the resident engineers whether their patrolman are repairing the shoulders, opening the drains, or making patches on macadam or concrete surfaces.

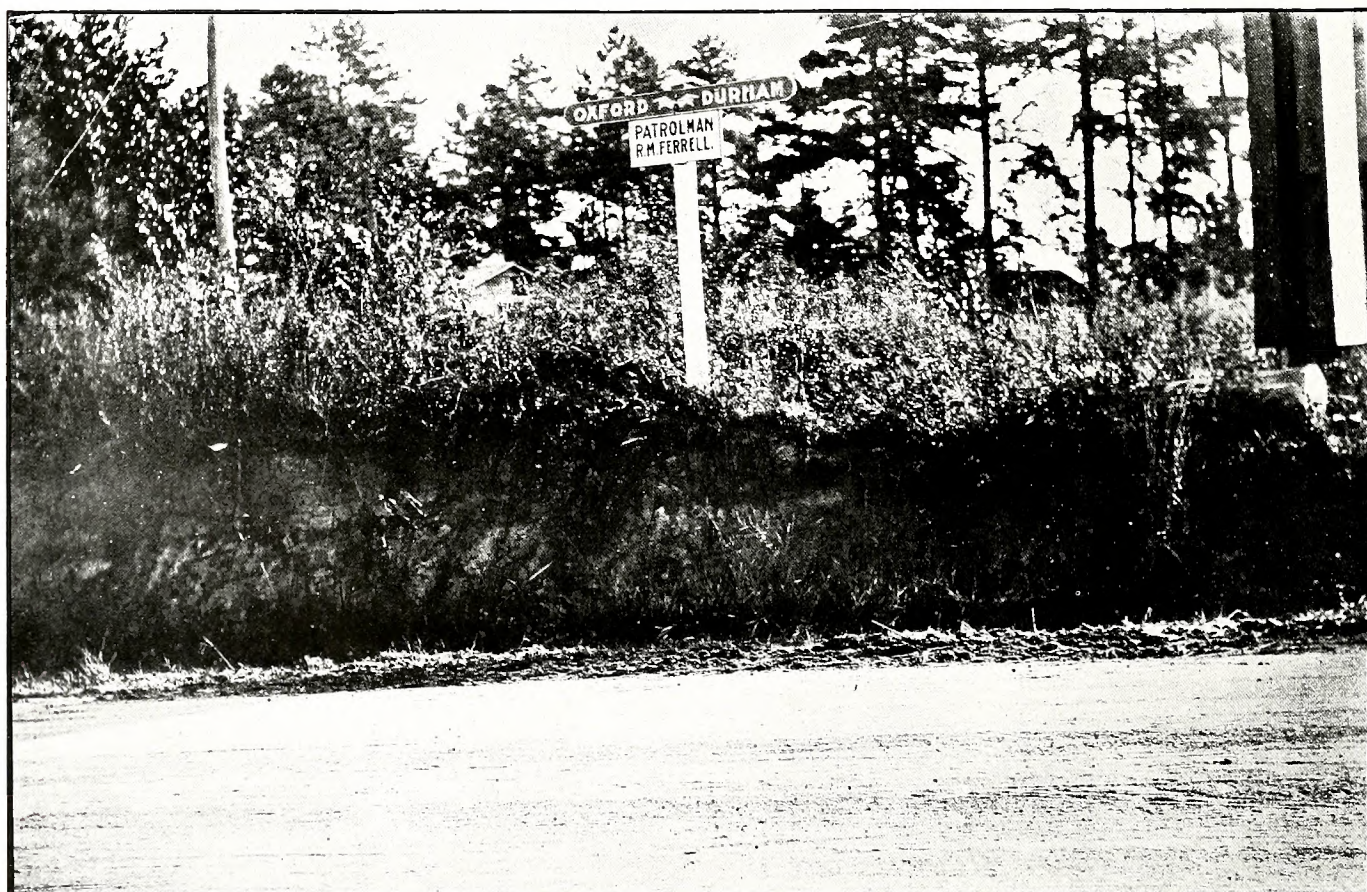
To enable the patrolman to make bituminous patches he is supplied with stone chips, and bituminous patching material at convenient points, so that with the aid of a wheelbarrow he is in a position to transport material without any unnecessary delay, from the stock piles to any abrasion or hole that occurs in the surfacing, and in this way no time is lost, due to lack of material, long hauls, etc., in making the necessary repairs.

It is difficult to teach patrolmen just how to make patches to the surface where the hole are deeper than 1" or 2", for they either apply too much bituminous material, which causes a pushing about and a "hump", or they will not supply a sufficient amount and there is immediate disintegration.

#### How to Make Patches.

The patrolman is instructed to make patches as follows:

First to sweep the hole thoroughly clean, free from all dirt and dust; paint the cavity with bituminous material; tamp the stone in well with a tamper, then spread bituminous material over the stone, and apply stone chips from  $\frac{1}{2}$ " to  $\frac{3}{4}$ " in size, just bringing the surface of the patch up to the same elevation as the adjoining surface of the road. It has been found that quite a number of patrolmen can make these patches without a great deal of trouble and get the proper amount of oil in so that the patch will be permanent and not push about, but there are many instances where they either get too much bituminous material in and it pushes about and makes a hump, or do not put sufficient in, and the consequence is "ravelling." To aid them, therefore, in getting just the proper amount of bituminous material in the patch, the patrolman should



Patrolman's Sign on National Highway

be supplied with a small wire basket, holding about  $\frac{1}{4}$  peck of stone. This basket has handles, and it is only necessary for him to dip the basket with the stone in it, in the bituminous material, and then raise it and allow it to drain. By the time he has the hole thoroughly swept out and is ready to apply the stone, the excess bituminous material has drained off, and it is only necessary to dump the stone from the basket into the hole, tamp it and cover with stone chips.

make all appointments, and hold him absolutely responsible for the work of his patrolmen.

### Keeping in Close Touch.

We also have in our system what is known as an inspecting engineer of maintenance who makes it his business to constantly go over all the roads being maintained, make reports as to their condition, the physical condition of the patrolmen, also their mental condition,



Highway Map of Georgia

—Courtesy B. F. Goodrich Co.

The question of politics should be absolutely eliminated, and the patrolmen should be made to understand that they will hold their positions as patrolmen on the road only through merit, and that if they do not render satisfactory services they will be dismissed. I know of no class of men who are affected more by politics than the patrolmen. They seem to believe that if they are put on the road by a politician or by political influence they have a perfect right to do as they please, and give the state as little as possible for the wage received. We, therefore, allow the resident engineer to

and the condition of the patrolmen's tools, etc. Copy of these reports are sent to the resident engineers, with the inspecting engineer's opinion as to the competency of the patrolmen, what they are doing, how they are doing it, etc. These reports are summarized and the summary is sent to the chief engineer. If there are any special points that the inspecting engineer wishes to call to the chief engineer's attention he marks the sheet with a red star, which indicates that there is an unusual condition existing to which he desires the chief engineer's attention called, and wishes him to go

carefully into the details of his report. The chief engineer then refers the matter in question to the resident engineer with the necessary instructions to put the work in the proper condition, or asks for a report from the resident engineer concerning a remedy for the bad condition. In this way, it is possible for the chief engineer to keep in close touch with each section of road, and is familiar with the efficiency of each patrolman.

The gang system has been used on a number of heavy travelled roads, and comprises a foreman, 7 to 10 men, taking care of from 40 to 60 miles of road. The gang is supplied with the necessary small tools, a roller, and a camping outfit. We found that while the gang system was slightly more economical the most satisfactory results were not secured, owing to the fact that the intervals between which the gang passes over the road are so long that when there is a disintegration in the surface it cannot be fixed immediately, and the consequence is that by the time the gang visits the spot it is a large hole. Then too, the men working in a gang are less efficient when separated then the patrolman, for they are in the habit of relying upon the instructions of the foreman of the gang and are not in the habit of thinking and acting for themselves.

#### Combination Gang and Patrol.

The combination gang and patrol system is most satisfactory on sections of road where there are many cuts and fills and where the banks very often slide. In such cases, it is the gang's duty to go over the roads early in the spring, remove all slides, shape all shoulders, open all ditches and culverts, make all the necessary repairs, and put the road in first-class condition. When this is done, the roads are then turned over to the patrolmen, and they can take care of a larger number of miles than they could if required to do all the work in the spring by themselves. The combination patrol and gang system is more economical on certain types of road than the gang or patrol systems alone. It is, however, impossible to set any hard and fast rule as to whether the gang should be used on any section of road or the patrolmen. In any event, it is necessary before deciding upon any method of maintenance to study carefully the topography of the country, the character of the soil, the amount and kind of traffic, and type of surfacing.

The writer believes that with a well-organized system of maintenance and with carefully selected patrolmen, it is possible to maintain roads in the highest state of efficiency, and that at the end of a period of 10 or 15 years the roads will be in better condition than they were when first taken over from the contractor. To secure such results, however, it is necessary to build up the road and increase its thickness in accordance with the amount that is worn away by traffic. To know exactly how much the roads wear away each year, a number of cross-sections are taken in the following manner:

Two permanent benches are established on each side of the road at the same elevation and a string is then stretched across which makes it possible to get an accurate measurement of the road surfacing. These readings are taken every two feet apart, transversely. This is done every six months and after each oiling, and a record is kept of exactly how much is worn off the surface of the road. Having this knowledge at hand, it is our object to place on the road, each year, an amount greater than that worn off, and to accomplish this end we have increased the size of the screenings

placed each year, during oiling, from  $\frac{1}{2}$ " to  $1\frac{1}{2}$ ". The quantity of oil has been reduced from  $\frac{3}{4}$  gallon to 1-3 and  $\frac{1}{4}$  gallon, and the quantity of stone chips has been gradually increased from 20 tons per mile to 125 tons per mile, depending upon the amount and intensity of traffic.

#### Oiling.

The method used in this State is as follows:

Bids are asked for delivering stone chips per ton mile on various roads we contemplate oiling, and a contract is let to the lowest bidder. The chips are piled at convenient points, about 15 to 20 tons per pile, and a day or two before the oiling truck reaches the work, they are re-distributed into smaller and more convenient piles, so that they can be more readily spread over the oil work. As soon as the oil truck passes over the road, large chips are spread on and immediately rolled in, then a layer of small chips is applied and also rolled in.

Each year the quantity of oil has been reduced and the quantity of stone chips increased until the percentage of the cost of oiling and stone chips is 40% for the stone chips.

The larger stone used are for the purpose of preventing the oil from forming a mat on top of the road which pushes about and makes a rough and uneven surface, but owing to the large increase and size of stone, they lock closely together, and there is little trouble due to pushing and shoving about. The amount of stone used is about 60 to 75 tons of large stone and 20 to 30 tons of small stone per mile.

The roads are thoroughly swept by a power sweeper and by hand before the oil is applied. The oil is applied by automobile truck distributor under pressure.

After the specifications are drawn up, bids are asked, calling for a certain number of pounds of oil to be applied per square yard of surface. With the bid the manufacturer of the oil must submit a sample as well as a guarantee that he will furnish oil, or tars, of a quality as good as the sample submitted, and also an analysis of the same. The contract specifies that if the oil, or tar, falls below a certain percentage specified, the commission will not pay for it but will only pay for the application. In order to get a fair sample of the oil from the tank car, or tar, as the case may be, is agitated and samples taken by means of an oil thief.

It has been found that if the roads are thoroughly swept, the oil applied, and good clean stone chips spread, that on medium travelled roads it is not necessary to apply oil more than once every two years, but heavy travelled roads should be oiled every year.

The study regarding the amount of wear on the roads has not been carried far enough to know just the amount worn off of each during each year, but as soon as this information is ascertained, an effort will be made to apply slightly more hard material each oiling until the base of the road has increased from 8" to 10" in thickness. It is believed that this amount of thickness is necessary to support the large loads being hauled over the roads in motor trucks and other heavy vehicles.

The Guilford county, N. C., commissioners, have voted to appropriate \$125,000 for the construction of eleven miles of concrete road between Greensboro and High Point. About four miles has already been built, and when the whole is completed it will be the finest road in the state.

## No "Dishing" of Federal Road Funds

IF THE SENATE pass the Shackelford bill, which got through the House by a clean majority of 200, the \$25,000,000 appropriation provided in the bill out of the public treasury to aid in the construction of post roads will not be immediately available for the use of the states in road construction. The apportionment and distribution of the money will be under the direction of the Secretary of Agriculture on conditions which he will prescribe. The money will not be shovelled out of the Treasury "just so" to please the constituencies of any Representative or Senator or particular group of Representatives or Senators who may have been most active in the enactment of the law, and the man with the largest shovel will not get for that reason the biggest share of the fund. Other things being equal the states with well organized highway departments will be preferred in the distribution, the law assuming that the states which have provided for the construction of public roads under competent direction can be most safely entrusted with the disposition of the fund appropriated by the Congress at Washington.

The states must first make application to the Secretary of Agriculture for aid in the construction of any rural post road, the Secretary must determine whether or not the application falls within the provisions of the bill and in the application is approved by him the road must be built upon plans and specifications approved by him and within such estimates as to cost as in his judgment would be fair and reasonable. In order that the government get what it pays for the secretary will be required to inspect through its agents the quality of construction and in no case can he pay less than 30 per cent nor more than 50 per cent of the reasonable cost of construction and maintenance of any rural post road. It will be seen, therefore, that the Federal Treasury will be securely guarded in the expenditure of the good roads fund and that this fund will not be dissipated to meet political emergencies. This is the first step towards taking the public roads and their building, maintenance and administration out of politics, the bane of all efforts heretofore made looking to the permanent improvement of the highways of the country.

Not only will the Secretary of Agriculture direct the apportionment and distribution of the federal aid fund and designate the roads for improvement; but he will pass upon the character of roads that shall be constructed, and this is a most important element in the whole problem. There are in the United States about 2,240,000 miles of public roads; but it is not intended or desired or necessary that they should all be constructed of the same materials or on the same plan. They must be surveyed and located by competent engineers so that they give the best service to the traffic, they must be drained so as to make them available for use in all conditions of weather, they must be graded and surfaced and provided with bridges and culverts, and they ought to be of standard width; but they cannot be and need not be constructed of the same materials. It is estimated by the United States Office of Public Roads and Rural Engineering that the thorough scientific improvement of about 18 per cent of the rural post roads, which are the main highways of the country, would take care of 90 per cent of the traffic; but this improvement must be made on approved plans directed by efficient builders and with careful regard to the service required of

the roads so improved. It would be waste "to spend public money on the almost impossible task of improving hundreds of thousands of miles of branch roads that lead to the farm gate rather than to build the main roads so that the farmers, by draining and dragging the mile or two necessary to get on the main road, can have easy access to market." It would be little short of criminal to build macadam roads in the sand-clay country where sand and clay would serve all the demands of the traffic and at one-tenth the cost.

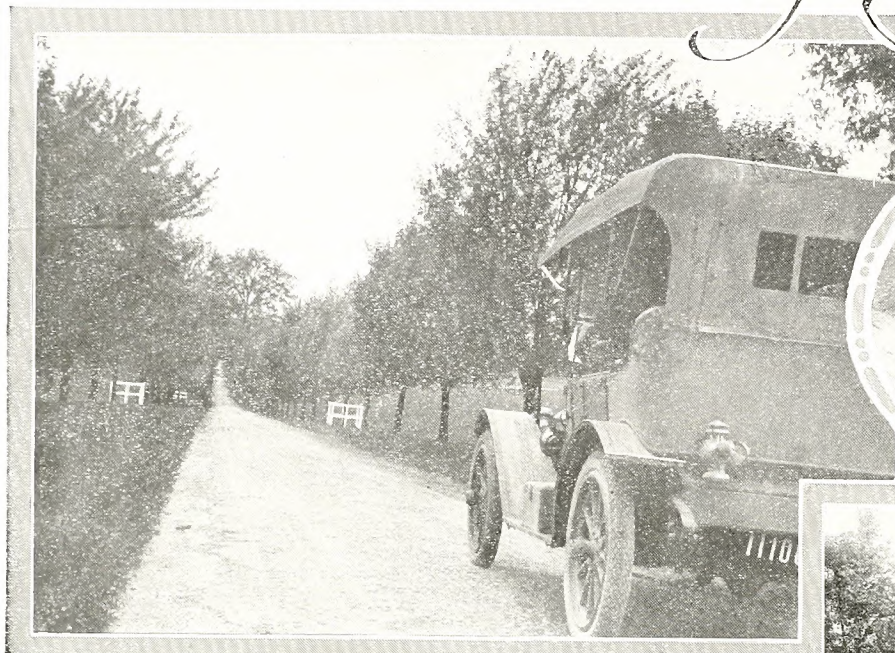
### Emphasize Right Materials.

This point was emphasized in a recent address of Mr. J. E. Pennybacker, United States Chief of Roads Economics, to the convention of Virginia road builders. "The Creator," he said, "exercised a considerable influence in the determination of types of highway by so distributing road materials to make the type conform to the material available. He placed up and down the length of the great Valley of Virginia an abundance of limestone, thus making feasible at moderate cost the construction of limestone macadam roads. It is idle to talk of building sand-clay roads in the Valley of Virginia, for while the Creator gave to that favored region an abundance of clay He put most of the sand east of the Blue Ridge, and it can hardly be contended that sand should be hauled to the Valley of Virginia in order to build sand-clay roads rather than to construct limestone roads of native material. By the same token it would be folly to haul limestone to the eastern, southeastern and southern parts of the state where sand and clay abound to build roads which can be more economically constructed of the materials nature has provided immediately at hand.

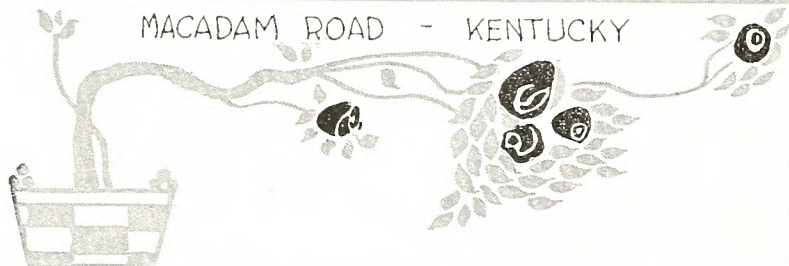
What is true of the conditions in Virginia is true generally of all other states in the Union. Leonard Tufts has built serviceable roads in the pineland country of North Carolina of sand and clay which provide amply for the traffic of the region but not roads which are required in the mountain districts. Governor Locke Craig, of North Carolina, said recently while on a visit to New York, that the mountain region of his state was never so prosperous and that "the maximum prosperity has not come from politics but largely from the building of improved highways so that the people might get out to market and the automobiles get in to the scenery. Four main highways have within recent months been cut across the Blue Ridge." It goes without saying that these highways have not been built of sand and clay. That would be unbusinesslike as the mountains are full of stone and the lowlands of stone and clay; the main purpose of the road builders of this day is to get out of the mud.

No public road is built right that is not built according to some well approved plan and under competent direction. The cost should be regulated by the cost of materials, the expenses of administration fixed charges of maintenance, and volume of traffic. With 18 per cent of the roads of the country improved according to a defined plan covering all these conditions, it is estimated that the problem would be solved. This would mean the building or improvement of about 400,000 miles of rural post roads, or roads leading to market, and counting the appropriation provided in the Shackelford bill and the appropriations made by the several states, it will be possible in the course of twenty years to provide roads of good quality sufficient for all the industrial needs of the country.

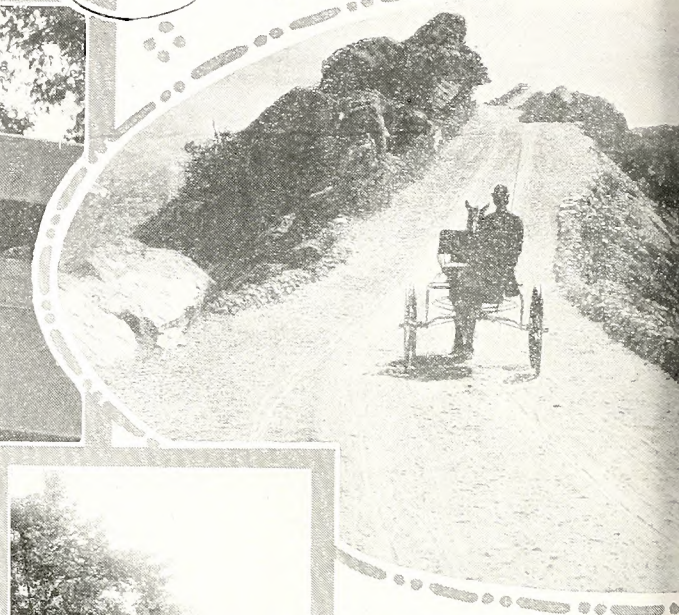
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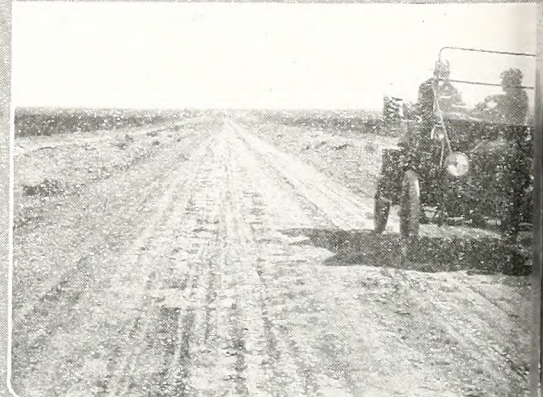
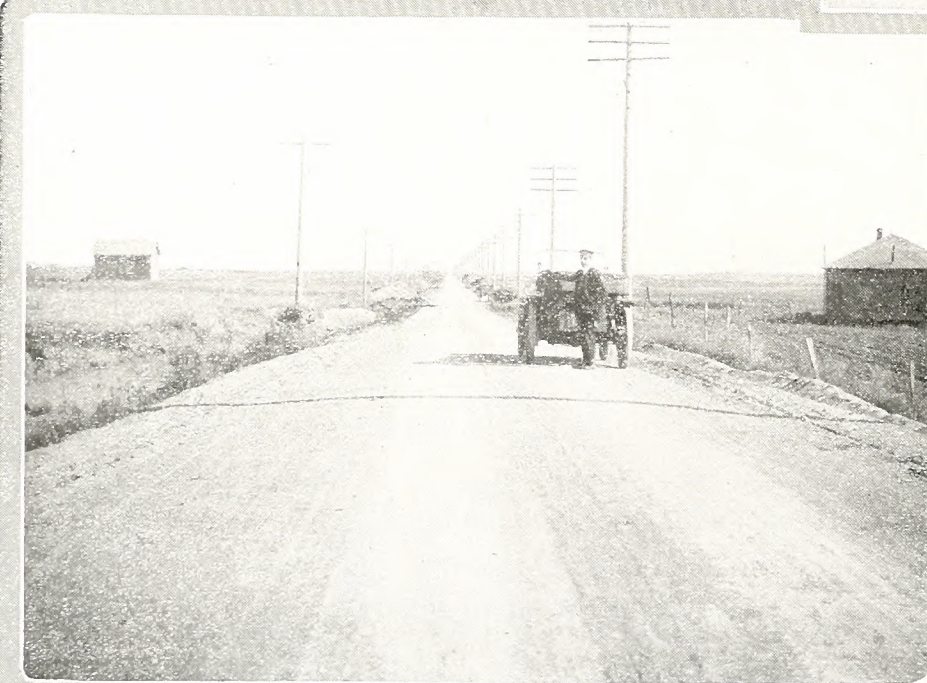
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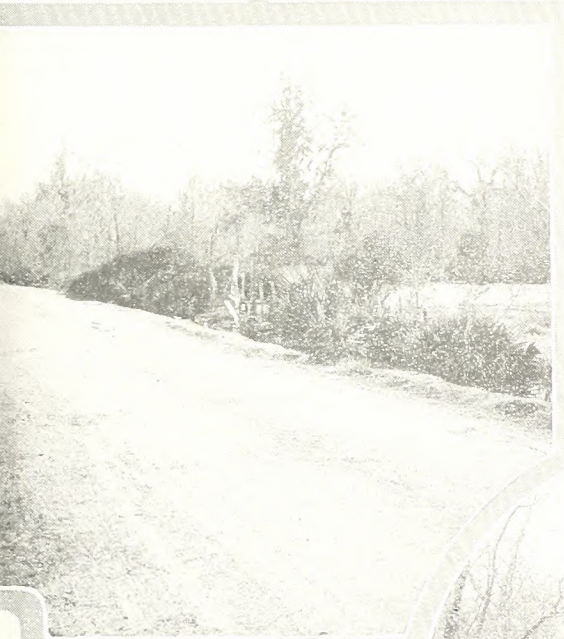
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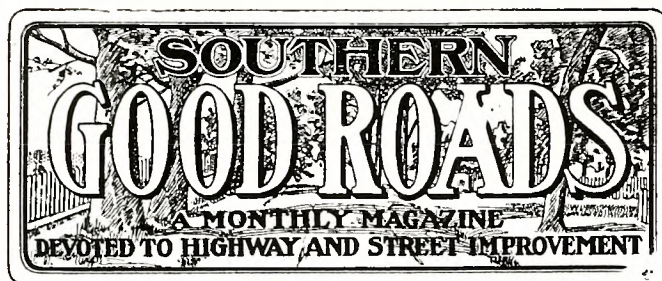
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No. 3.

**PIEDMONT ROAD BUILDING.**

Those counties in North Carolina that lie along the foot of the Blue Ridge have for a number of years been able to call the attention of the business world to their natural resources and the progressiveness of their citizens. Manufacturing has developed there faster than in any other part of the South and their towns have grown with amazing rapidity. Now the country districts are scheduled to come in for their share in a larger measure than ever before. For several years much good work in road construction has been done by the individual counties, with an eye to serving only their immediate communities. This has served to bring through that section several of the great national roads that have been located. The coming of these national arteries of intimacy have produced a most beneficent spirit among the Piedmont people and they are beginning to respond with a vim that bids fair to attract national attention.

This response is taking concrete form in linking all the counties together with a comprehensive system of good roads that furnish easy avenues for neighborly intercourse between the peoples of all their towns and cities and farming sections. The first decided step in this direction was the completion of the National Highway through Davidson county, which is now done and the last steel and concrete bridge thrown open to travel by the folks from everywhere. Guilford county

wants their part of the road to be a little better than anywhere else, so they are now building fifteen miles of concrete highway to link Greensboro and High Point together. Randolph county wants to be linked on to Guilford and Davidson, so a road has been completed to Denton, on the Davidson line, and a fine gravel road is now being finished to High Point. They have built another fine road to Greensboro, by way of Randleman, Guilford meeting them with the glad hand in every move.

Davidson county is now building to meet the Randolph road at Denton and when this is done will complete a wonderful ninety-mile touring circle. Forsyth is ready to link on to the Davidson county roads going to the line from Lexington and Thomasville. Rowan and Stanly are moving to link Salisbury and Badin together with a fine road and Davidson, Montgomery and Stanly are pulling on the same rope for a road leading off the National Highway from Lexington to Badin. Central North Carolina is ready to come up and join hands with the Piedmont counties in finishing a splendid highway from Pinehurst to Charlotte. The Boone National Highway will come in to this section from the west and will complete this great network of roads. From Greensboro the plan is spreading eastward to hurry up and fill the unimproved gap between that city and the state capital, Raleigh. Rowan and Davidson counties are moving to abolish the toll bridge over the Yadkin River between Lexington and Salisbury.

When the work now definitely in view is completed this section of the South will be placed upon every tourist's map in glad colors. Much of it will be ready for the summer tourist this year.

One of the finest examples of proper road maintenance in this country is furnished at Cedar Lodge Farm, the big estate of Major Frank H. Flee, near Thomasville, N. C. Forty miles of good roads have been built on the farm, wholly out of materials found there. Every foot of it is carefully looked after the minute there is a need. A narrow-tired vehicle is just as welcome on one of Major Flee's roads as would be a stray hound dog in his sheep pasture. He didn't build these roads to be destroyed in that manner. They cost him too much money. Public roads cost the people too much money for them to turn right around and contribute to their wilful destruction. Broad tires are a public need.

It is a hard matter for some folks to understand that every man has a right to his part of the public road. Every man who refuse to get over on his side and let the man who is traveling by swifter mode pass, as he is entitled to, puts himself in the attitude of the middle hog who tries to root the other shoats from the trough. Road hogs provoke more profanity on the public highways than any other trouble, unless it should be the lassitude of those communities who refuse to pull themselves out of the mud.

### Good Roads Profit Cities.

Men who have been successful in the building up of large enterprises, men who have made a life-long study of conditions of affairs where bad roads predominate, and women who have put their best efforts into the improving of the highways are unanimous in one opinion—that it is the duty of the big cities to help in the building of good roads that lead into their limits.

The cities derive as much benefit, if not more, than the residents along the route of the proposed improvement.

It has been proven time and time again that farms with a hard road outlet into the city are far more valuable than the farm that is shut off from the city five months out of the year on account of impassable roads.

The farmer benefits by easier hauling, cheaper transportation, time saving, and better social conditions for his wife, children, and self.

The city benefits by cheaper produce and the opportunity for the rural resident to get into the city and make purchases, and the merchant in town can extend his zone of delivery far out into the country.

The best proof that good roads bring prosperity is brought home to the very doors of Washington by a comparison of the two states on the borders of the District of Columbia.

Maryland has practically finished a six-year job of good road building. Virginia has hardly commenced. A two-hour automobile ride to Frederick, followed by a two-hour ride through Virginia to Warrenton will show a contrast that is not hard to understand.

Washington has profited greatly by the good road to Frederick. It has brought thousands of dollars to this city.

Within the past year a good road has been built to Fairfax, Va., which is half way to Warrenton. Conditions for the better are noticeable along this stretch. Twenty-three more miles are needed to put Warrenton in close touch with the Capital. A greater part of the amount necessary has been raised in the country district, the balance is looked for in Washington.

Just how far the business men and motorists in Washington will go along this line is problematical, but that Washington will profit by a good road to Warrenton or any other Virginia town within a radius of fifty to one hundred miles is a certainty. Making the path to one's door easy for the purchasers is always good advertising. Helping build a good road into the city that will bring thousands of buyers into town is surely making the path easier.

### Again, That Richmond Road.

A situation has developed in Washington recently which to say the least puts visiting motorists in the same position with the burglar who ran up a blind alley.

There is never a day passes that some Northern touring party does not come into Washington, en route to the South, only to find that the best way to get out of the capital is by reversing their route.

They have toured over Maryland roads, and have nothing but praise for them.

For some reason or another a motorist dislikes to retrace his steps, even when there are two routes to a certain point, and one of them is bad, nine times out of ten the driver will go out one way and come back another.

Another thing that a tourist dislikes is to go out of his way or make a long detour. The automobile owner

decides that he will go touring. He will pick his objective point, map out his route, and after making the start, gets considerably peeved at any obstacle that confronts him.

Washington is the fly in the ointment in the East today. Everybody in the North who owns a car seems to have developed a strong desire to ride through Dixie.

At present there is only one way to get there comfortably, and that is via the Shenandoah Valley. There are three outlets from Washington to Richmond, none of which are passable in the winter and early spring, and are always in bad shape after a rainstorm.

These three routes are respectively: the one via Fredericksburg, a few miles of which are in such deplorable shape that they are trying, trying even under the most favorable conditions; the one via Leesburg and Bluemont, which is rough and extremely muddy in parts. This route is at present the shortest way to Winchester and the Valley Pike. The third route is the one via Warrenton. This road is called in this section of the country the Ridge Road because it winds through the foothills of the Blue Ridge. It passes through the most beautiful and historic part of the Old Dominion, taking in Fairfax, Warrenton, Culpeper, Gordonsville and Louisa. Over half of this route is of macadam construction, and while a greater part of the balance is hard pike, it is too rough for comfortable touring.

Richmond motorists are gradually getting the road from Richmond to Gordonsville in good shape. From Gordonsville to Orange the entire distance is hard macadam. Part of the way out of Orange is good; the balance into Culpeper good only in dry weather.

Culpeper county is getting her road in good condition north toward the Rappahannock River, from which point a splendid road leads into Warrenton and through that city toward Washington. Fairfax to Washington is excellent, leaving twenty-three miles between the Fauquier county line and Fairfax to be improved. A coterie of Warrenton men of affairs have banded together and launched a scheme for a toll road over this stretch. When this is finished simultaneously with the other improvements along this route, Washington will have an outlet to the South that it can be proud of.

When this comes true, Washington will regain its good name in the motoring world. Tourists will all be routed through that city, and not via Baltimore and Winchester. The thousands of dollars that are being lost annually by the business men of that city will be placed on the credit side of the ledger, and last, but not least, Washington motorists will have a good hard road of 170 miles in length through to Richmond.

### Concrete Construction Increases.

America seems destined to become a nation of concrete roads, streets and alleys.

Figures recently compiled show that at the end of 1915 there was more than sixty times the amount of concrete pavement in the United States than there was previous to 1909. The figures are 819,515 square yards in 1909 and 49,409,128 square yards in 1915.

In 1914 the yardage of concrete pavement laid on city streets exceeded all other types of pavement in the Middle West States of Illinois, Indiana, Iowa, Michigan, Missouri, Minnesota and Wisconsin.

Dimmit county, Texas, has let contracts for \$40,000 of road building this spring and summer.

# Comparison of Highway Bridge Materials

By **SEARCY B. BLACK**

Highway Engineer, University of Georgia

A COMPARISON of reinforced concrete, steel, untreated timber and creosoted timber, as material for highway trestle bridges, has been recently submitted in a report to the Commissioners of Brooks county, Georgia. The conclusion reached was that, under present conditions, trestles of creosoted timber is the most economical construction for the approaches to the channel spans and for the minor stream crossings.

The valleys of the streams of Brooks county are wide and flat and subject to frequent shallow overflow. These conditions necessitate long fills for approaches and, in order to secure adequate waterway, long, comparatively low bridges. Generally foundations are easily secured so short spans are economical. There is no stone or gravel suitable for concrete available in the county. Comparatively good bridge timber is abundant and fairly cheap.

To properly select the material for these trestles four designs were prepared for a trestle two hundred feet long having an average height of ten feet. All the designs were made for a twelve ton road roller with eight tons concentrated on the rear axle.

The types were: (1) Concrete beam and slab construction with supporting columns and footings 20 feet center to center and reinforced concrete abutments 12 feet high at each end; the roadway to be coated with  $\frac{1}{4}$  inch of sand and asphalt rails of 2 inch gas pipe. The annual charges against such a structure, since concrete does not depreciate materially, would be interest on the first cost, renewing the asphalt and sand coat about once in four years and painting the rails.

(2) Steel joists and bents 20 feet center to center resting on concrete footings and reinforced concrete abutments at each end; floor of wood three inches thick; rails of steel angles. In this structure the concrete abutments and footings may be considered as permanent, the steel would have a life of from 40 to 60 years, depending upon the care taken of it, and the wooden floor a life of from 5 to 7 years. The annual charges would be interest on the first cost, depreciation on the steel at 2 per cent, painting and depreciation on the wooden floor at 16 per cent.

(3) Timber treated with creosote oil for piles, caps and joists, and with untreated wood rails and floor. The bents, consisting of four piles braced together, are 19 feet center to center; the joists consist of eight 4 in. x 12 in. and support a three inch wood floor. The end bents were left open for the toe of the fills, so to get an equivalent waterway the length was taken at 209 feet instead of 200 feet. The life of creosoted timber is generally estimated to be between 20 and 30 years. The life of the floor and rails of untreated timber would be from 5 to 7 years. The annual charges would therefore, be interest on first cost, depreciation on the creosoted timber at 5 per cent, depreciation on the floor and rails at 15 per cent., and fire risk at  $1\frac{1}{2}$  per cent.

(4) Timber trestles, as described above, but of untreated timber throughout. The life of the entire structure would be from 5 to 7 years and the annual charges would be interest on the first cost, depreciation at 15 per cent, and fire risk at  $1\frac{1}{2}$  per cent.

The depreciation charge of 15 per cent, against untreated timber is somewhat high, but is intended to in-

clude the minor annual repairs ever present in wooden bridges.

The local prices of materials are as follows:

Cement per barrel	\$1.80
Sand per cu. yard	1.50
Gravel per cubic yard	2.75
Selected bridge lumber (per M ft. b. m.)	18.00
\$18.00 M for lumber,	
\$16.00 M for treatment,	
\$4.00 M. freight,	

Total \$38.00 per M. ft. b. m.

Untreated yellow pine piles 10c. per lin. ft. and 15c. per lin. ft. for driving.

Treated piles 25c. per lin. ft. and 15c. per ft. for driving.

Common labor 10c. per hour.

Estimated cost of a 200 feet Concrete Trestle:

154 cu. yd. concrete in trestle @ \$14.00 cu. yd.	\$2,156.00
54 cu. yd. concrete in abut. @ \$14.00 cu. yd.	756.00
960 lin. ft. of piles @ 25c. per lin. ft.	240.00
Hauling 210 tons 3 miles @ 20c. a ton per mile	126.00
Gas pipe for rail 2710 lb. @ $3\frac{1}{2}$	95.00
Surfacing 360 sq. yd. with asphalt and sand..	36.00

\$3,407.00

Incidentals will make total cost about \$3,425.00.

## Annual Charges.

Interest on \$3,425.00 @ 5 per cent.	\$171.15
Resurfacing with asphalt and sand once every four years and painting rails.	10.00

Total annual charges..... \$181.15

Estimated Cost of a 200 ft. Steel Trestle:

54 cu. yd. concrete in abutments @ \$14.00....	\$ 756.00
27 cu. yd. concrete in footings @ \$8.00.....	216.00
11,200 ft. b. m. flooring @ \$22.00 per M placed	246.00
900 lin. ft. of piling @ 25c. per lin. ft.	225.00
48,000 lb. of steel @ \$3.25 per 100 lb. erected..	1,560.00

\$3,003.00

Incidentals will make total cost about \$3,020.00.

## Annual Charges.

Interest on \$3,020.00 @ 5%.....	\$ 151.00
Depreciation on steel \$1560 @ 2%.....	31.20
Depreciation on floor \$246.00 @ 15%.....	36.90
Painting \$48.00 every years or per year.....	8.00

Total annual charges.....\$227.70

Estimated Cost of a 209 foot Creosoted Wood Trestle:

10,700 ft. b. m. creosoted timber @ \$38 per M.	\$ 406.60
Placing 10.7 M ft. lumber @ \$8.00 per M....	86.60
12,800 ft. b. m. untreated flooring, etc., @ \$18.00 M.....	220.40
Placing 12.8 M ft. of creosoted piling @ 40c. ft.	102.40
100 lin. ft. of creosoted piling @ 40c. ft.	400.00

\$1,226.00

Incidentals will make total cost about \$1,240.00

## Annual Charges.

Estimated Cost of a 209 foot Wooden Trestle.	
23,500 ft. b. m. lumber at \$18.00 per M.....	\$423.00

Placing 23.5 M lumber at \$8.00 per M..... 188.00  
 100 lin. ft. of piling @ 25c. per lin. ft..... 250.00

\$861.00

Incidentals will make total cost about \$875.00.

#### Annual Charges.

Interest on \$875.00 @ 5% .....\$ 43.75  
 Depreciation on \$875.00 at 15%..... 131.25  
 Fire risk at 1½%..... 13.12

Total Annual Charges.....\$188.12

From the above estimates it would seem that creosoted wood is the most economical material for these trestle bridges. The first cost is low compared with concrete or steel, and the annual charges show it to be economical.

Conditions similar to those in Brooks county probably exist in many counties of south Georgia, Alabama and Florida.

#### Building Highway For Ages.

President Henry B. Joy, of the Lincoln Highway Association says:

"The Lincoln Highway Association is laying seedling miles of concrete roads in every county along the route, knowing that every such mile will eventually grow into longer and longer sections as the people of every locality come to appreciate the benefits of inexpensive, permanent, hard-surfaced construction, and devote their road funds to such construction, so that eventually it will be possible for the American tourist to start from New York and drive West for nearly 4,000 miles over a broad concrete boulevard to the Golden Gate.

"We have adopted concrete construction on that route for the reason that concrete has been shown by tests and experience to be the most permanent and least expensive. What we build today on the Lincoln Highway will be here fifty years hence for the use of posterity.

"That is our dream and it is coming true as surely as the people of America awake to the necessity of permanent road construction. Such road construction is necessary not only on our main transcontinental route of travel, but on every mile of connecting road in the United States.

"The Lincoln Highway Association is for good roads everywhere, and by good roads we mean concrete roads which by investigation and tests, we have found to be the best."

"The Lincoln Highway Association is building for ages. The Lincoln Highway will be an evolution. None of us may see it, completed, but what we accomplish to-day will be the basis for greater accomplishments to-morrow, and should be an example for future generations to follow in constructing our first great arterial highway to last forever as America's Appian-way.

It was scarcely three years ago—on September 10, 1913, to be exact—that a small group of public-spirited men conceived the idea of establishing a transcontinental highway for the purpose of encouraging automobile travel and making a main cross country artery of travel. Since then the work on the road has been pushed unceasingly.

A short time ago the first of the concrete roads was established along the route. To-day there are more than one hundred and forty miles of concrete along the highways—more than five times that of any other material used in construction.

#### "Go Somewhere" by the Auto Route.

Roads travel has become a yearly habit with thousands of Americans. While it is true that highways betterment ought first to be considered from the commercial and farming needs of the several states, the gradual connecting of main lines of communication encourages the visitor from a distance, who frequently becomes an investor and in some instances a permanent resident.

In the days of not so long ago, with the approach of each spring, it was more than general for persons in many sections to send for travel literature issued by the railroads and to study and plan trips to those many delightful localities so adjectively described by the travel booster.

With the rapid increase in automobiling there has come this multiplied desire "to go somewhere," and all over the land motorists are now working over their plans for touring trips. These vary from the ambitious transcontinental—either from ocean to ocean or border to Gulf—journey, to those taking in only a state or two as a circuit jaunt.

In this group are thousands who, as members of the American Automobile Association, utilize the vast accumulation of road data and routes assembled by the bureaus in Washington and New York serve as national clearing houses of touring information. There are other thousands of potential tourists, new to the ownership of automobiles and not members of the A. A. A., who are only too often blindly planning trips of more or less ambitious mileages with but little idea of what is before them as to possible and most traveled routes.

While in this broad land there are thousands of routes that are usable and toured over, the old saying, "the longest way round is the shortest way home," many times has its best illustration in the routable trips between well known places. Neither a railroad map nor an atlas is a safe guide for touring, but, just as in all other lines of effort, there is to be had a wide choice of maps especially issued for automobile tourists. These maps are the concrete efforts of the more than 600 clubs and over 100,000 members of the A. A. A., and represent the latest reports from this combined knowledge and experience.

Chairman David Joyee of the A. A. A. Touring Board suggests that whenever a motorist starts his plans for this year's tour he should base them on accurate knowledge of tourable routes by writing for information to the bureaus of the A. A. A. Riggs Building, Washington, D. C., and 437 Fifth Avenue, New York City.

#### Jefferson Highway Popular.

The Jefferson highway project is the most popular good roads proposition that has ever entered Arkansas, according to Hugh R. Carter, state highway engineer, and George Sengel, secretary of the Business Men's Club of Fort Smith, who returned from Waldron, DeQueen and Mena, where they have been holding meetings. All three towns sent delegates to the state convention held at Fort Smith February 23 and 24. Mr. Carter says Sevier county proposes to be the first county to have its part of the Jefferson highway completed. Mr. Carter returned there to prepare the plans and specifications for a north and south road to be added to the international highway.

Cape May, Pa., board of freeholders has awarded contracts for \$201,000 worth of fine roads along the coast to be built during this year.

### County Bonds the Best Way.

Objection has been made to the issue of county bonds for road construction on the ground that "we should pay as we go and not burden posterity with debts contracted by us for our own benefit;" but this objection is as full of holes as a sieve. Nearly all the county road bonds run for twenty years and in twenty years considerable posterity will have matured along with the maturing and retirement of the bonds and if the roads are built in a scientific way posterity will not have much more to do than to restore the surfacing upon the durable foundations that have been laid.

The argument that the poorer people cannot stand the added burden of bond issue for road building will not stand investigation. Four years ago, the peasants of France bought \$20,000,000 of the bonds of an American railroad, notwithstanding the fact that within less than a hundred years France has spent \$613,000,000 in building its road system.

Two years ago over 41 per cent of the counties in the United States had issued bonds for highway construction. The total amount of such bonds voted by the people was \$286,557,073. The county highway bonds are regarded as an excellent investment. The funds to retire these bonds is accumulated by the payment of annual installments by the taxpayers which draw interest continuously and accumulate a sufficient amount to discharge the debt at maturity. "Five per cent highway bonds are common with the sinking fund calculated to draw 3½ per cent annually;" so that posterity would not be greatly troubled by any burden on this account. "A tax for road improvement is an investment and not a loss." "The increase in farm values as the result of road improvement is so great that the tax rate is frequently lower than before the issuance of the bonds."

Good roads increase population. The figures show that in counties where only 1.5 per cent of the roads have been improved the population has decreased and in counties where 40 per cent of the roads have been improved the population has increased. All experience in this country has proved that the improvement of the main travelled roads by bond issues is the most certain and feasible means of doing the thing that would most promote the prosperity and happiness of the people and the development of industrial and commercial activities. Three hundred years of criminal neglect has demonstrated that good roads cannot be obtained by ignorant management, political manipulation and ordinary taxation. Solomon would say to the counties and states: Vote bonds for highway construction.

### West Virginia.

Unless there is a hitch in the present plans, the coming year will be a banner one in the way of road improvement in the state of West Virginia and it is roughly estimated that close to \$5,000,000 will be expended in the construction of new permanent highways and the improvement of old ones. The good roads movement has taken on a new lease of life in this state and the wise politician who includes the proposition of road improvement in his platform is going to find it largely to his advantage. The movement is not confining itself to any one section at the present time, but particular interest is being shown by the progressive citizens in Marion, Harrison, Taylor and Preston counties. Three districts in Preston county have passed bond issues since the first of the year and actual work is to begin as soon as possible.

### Prizes for Good Roads Essays.

Johnston County, N. C., is always starting something. William M. Saunders, President of the Johnston County Bank and Trust Company has begun what promises to be the greatest campaign for good roads ever started in North Carolina. In place of advertising for depositors he offers a prize of a one dollar bank deposit to every rural school in Johnston county for the best essay on "Good Roads."

Teachers are the judges in their respective schools and the essays unlimited. Children can go anywhere to secure information via State Highway Commission, U. S. Office of Public Roads, colleges, congressmen, libraries, newspapers, etc. The object is three-fold.

1. To teach the child thrift.
  2. To acquaint it with local affairs, the roads.
  3. To learn the value of local institutions, the banks. The books are not mailed, the child must call in person for its book. In one county the bank deposits doubled in one year by giving the parents confidence in the banks. Let every bank in North Carolina follow the lead of Johnston county.
- D. H. WINSLOW.



## Happy Introduction

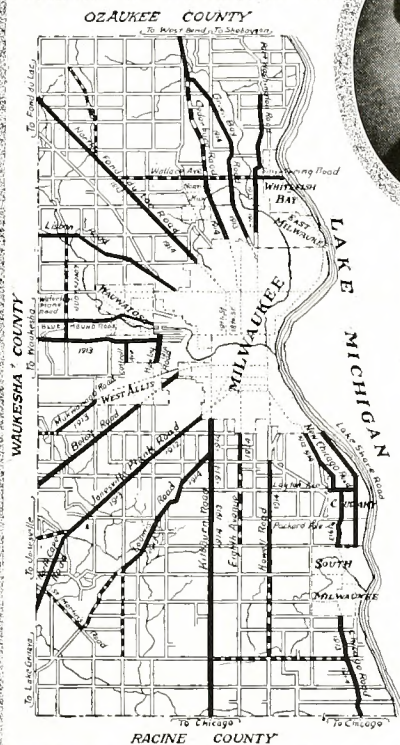
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# SOUTHERN EXPRESS COMPANY

"Serve the Public"

Map of Milwaukee County, Wisconsin, showing Concrete Roads. Heavy lines indicate finished roads, dotted lines work under construction during 1916.



H. J. Kuelling,  
County Highway  
Commissioner  
of Milwaukee  
County, Wis.



A Stretch of the Blue Mound Concrete Road, Milwaukee County, Wisconsin

## 86 Miles of Concrete Roads in Milwaukee County, Milwaukee, Wisconsin

HERE are a few facts about the concrete roads of Milwaukee County, Wisconsin, that are of national interest. Read them carefully and remember them the next time roads are discussed in your community. Better yet, tear out this page; it's worth keeping.

Concrete roads are hard, permanent roads constructed of sand and hard crushed stone or pebbles cemented permanently together with Portland cement into an even, solid wear-proof surface. Unlike other "improved" roads in which the broken stone is merely pressed together, the concrete road hardens with age into a monolithic mass which is unaffected by the summer heat or the spring flood and resists the wear of traffic. Cement-bound roads will not "run" in hot weather, automobiles will not lick up and remove the binder. Cement is a permanent binder and is an integral part of the road.

In four years there have been built in Milwaukee County over 86 miles of concrete roads. These roads have been built after the most exhaustive investigation, and in preference to any other type of road. In 1915, out of approximately 42 miles of new roads over 39 miles were built of concrete.

Milwaukee County has much in common with every community—its roads extend from the city far out into the country, they receive every kind of traffic, wagons, automobiles, motorcycles, carriages, and heavy city trucks. The concrete roads of Milwaukee County have increased property values, reduced hauling costs, and reduced road taxes for repairs and maintenance. They give satisfactory service every season of the year, in every kind of weather. They are unaffected by the hardest travel, free from holes and ruts, dustless in Summer, dry and mudless in the Spring, open all Winter. Why not build of concrete in your County?

In New York State, the cost of the 16-foot concrete roads, based on 200 miles laid under all conditions in 1914 and 1915, averaged \$9,500.00 per mile for all concrete work and surfacing. Including drainage, grading, etc., the total cost varies from \$12,000.00 to \$15,000.00 per mile. Ordinary macadam roads cost about \$9,000.00 per mile; but macadam is not a permanent road. It will soon rut and wear, the binder will wash out, or be sucked out by passing vehicles, running the maintenance cost into large figures.

The concrete road is inexpensive to maintain. The figures from the 1915 report the County Highway Commissioner of Milwaukee County show an average repair and maintenance cost of but \$58.00 per mile per year. Out of this small sum approximately \$23.00 per mile has been expended for the maintenance of road shoulders, etc., leaving the actual road maintenance cost but \$35.00 per mile.

When concrete roads are properly laid this low maintenance cost is not unusual but customary. The combined maintenance and repair costs on improved roads, other than concrete, of Massachusetts, Rhode Island, Connecticut, New Jersey and New York for eight years averaged \$608.00 per mile per year.

Our well illustrated and informative booklet "Portland Cement Concrete Highways" will be sent free of charge on request, and we invite correspondence relative to concrete road construction and maintenance.

When roads are built in your community build of concrete and you will have roads that are permanent, satisfactory, inexpensive to maintain; roads that will increase values, reduce the cost of hauling and serve you every day in the year.

Read what H. J. Kuelling, County Highway Commissioner, of Milwaukee County, Wisconsin, said:

"Our idea of concrete roads, generally, for country road construction, is shown by the fact that out of approximately forty-two miles of road to be built in 1915, we will build about thirty-nine miles of concrete. As shown by our report, the increase in traffic is very marked, and without a doubt there is also a very marked increase in property values and general prosperity along the roads."

If there is anything you want to know about the cost and maintenance, haulage statistics, repairs, etc., of the Milwaukee County Concrete Roads, write to Mr. Kuelling personally at his office in the Pereles Building, Milwaukee, Wisconsin.

# CONCRETE FOR PERMANENCE

PORTLAND CEMENT ASSOCIATION

Southwestern Life Bldg. 1418 Walnut Street  
Dallas, Texas Philadelphia

111 West Washington Street, Chicago

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San Francisco

Commerce Building  
Kansas City

One of the latest proposals for an interstate highway is a route from Buffalo, N. Y., to Mammoth Cave, Ky. It is to be known as the "Wonderway." The plan is for the road to pass through Cleveland, Lima and Southern Ohio. Between these points three separate routes are under consideration, but a definite decision, it is expected, will soon be reached. An effort will be made to get state assistance from Ohio for permanent improvement of the course selected.

The fourth annual session of the County Road Engineers' Association of Kentucky, held at Lexington on February, chose the following officers: President, W. H. Edwards, of Woodford county; first vice president, William P. Caldwell, of Boyle county; second vice president, Clinton Woodward, of Jessamine county; third vice president, R. W. Davis, of Fayette county.

Arizona will ask the federal government for a loan of \$800,000 for the immediate building of more good roads through national parks in that state, this amount to be paid back from funds from the parks.

Mississippians are now engaged in promoting the Robert E. Lee Highway, proposed to run from Memphis, Tenn., through Mississippi and on to New Orleans.

## Road Builders' Attention

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1 Mack 5 ton Auto Truck dumping body.

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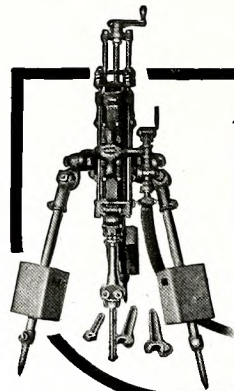
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**E. F. CRAVEN**  
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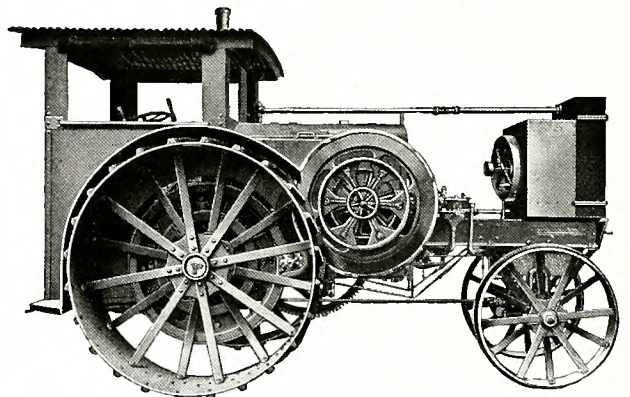
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Every dollar you cut the cost of road grading is a dollar added to your net profit. We can put you in touch with one man who says he cut the cost of road grading in Louisiana from \$26 per mile with mule power to \$4.50 per mile with Mogul kerosene tractor power. His figures are in the official records of his parish.

That is probably an extreme case, but the fact that so large a saving as this could be made, is interesting. It suggests that possibly your costs are higher than they need be. Perhaps a little investigation would pay. Would you like to see some of the figures we have collected—some of the savings we have helped other contractors and road builders to make by changing over to Mogul or Titan kerosene tractor power? They'll cost you nothing but a two cent stamp and a little time. Write for them.

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151 Harvester Building

Chicago U S A

# SOUTHERN GOOD ROADS

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## Third North Carolina Road Institute

By MISS H. M. BERRY

Secretary North Carolina Geological and Economic Survey

A THIRD Road Institute was held at the University of North Carolina February 7-12 under the auspices of the State University, the State Highway Commission and the North Carolina Geological and Economic Survey.

That this institute is supplying a vital need to North Carolina is evidenced by the fact that there has been a steady increase in the attendance and those present with road work in North Carolina from the county commissioner, road commissioner, road engineer, road superintendent, road foreman, road supervisor to citizens who are interested from the standpoint of general public betterment.

At the First Institute, held two years ago, there were 24 counties represented, with 54 men attending. At the Second Institute, held in 1915, there were 29 counties represented with 80 men attending. At the Third Institute, held this past February, there were 127 men attending, representing the following 43 counties: Alamance, Anson, Avery, Beaufort, Bertie, Cabarrus, Caldwell, Catawba, Chatham, Craven, Currituck, Davidson, Duplin, Durham, Edgecombe, Forsyth, Franklin, Granville, Greene, Guilford, Halifax, Harnett, Henderson, Iredell, Lincoln, McDowell, Madison, Mecklenburg, Moore, New Hanover, Northampton, Onslow, Orange, Person, Richmond, Robeson, Rowan, Sampson, Scotland, Surry, Wake, Warren and Wilkes; and 5 states, Virginia, Tennessee, Texas, District of Columbia and West Virginia. Of the 1916 attendance, 20 were road engineers, 19 road superintendents, 31 county commissioners and road commissioners, 12 road supervisors, 4 patrolmen, 20 machinery and materials men and contractors. The balance were men who were interested in road work, including 20 students of the University.

It was the endeavor of those who had the Institute in charge to make it as practicable as possible and the lecturers not only spoke in a very concrete and practical manner, freely illustrating their points by use of charts and the blackboard, but increased the value of the points brought out by inviting questions and discussions from those in attendance; so that this institute consisted of a free interchange of ideas and experiences relating to road problems in North Carolina rather than a series of cut-and-dried lectures.

The afternoons were given over to practical demonstrations of various forms of road machinery, such as

the road drag, road hone, wheel scraper, grader, tractor, culverts, etc.

Among those on the program for lectures and discussions were Honorable A. D. Williams, Professor of Highway Engineering at the University of West Virginia and State Highway Engineer of West Virginia; Mr. D. H. Winslow, Senior Highway Engineer in charge of maintenance of the U. S. Office of Public Roads and Rural Engineering; Mr. W. S. Fallis, State Highway Engineer of North Carolina; Mr. W. A. McGirt, Chairman of the Board of County Commissioners of New Hanover county; Professors Collier Cobb, T. F. Hickerson and John E. Smith of the University of North Carolina faculty; Mr. Joseph Hyde Pratt, State Geologist and Director of the Road Institute; Mr. R. T. Brown, Highway Engineer of Davidson county; Colonel John N. Ambler, Civil Engineer of Winston-Salem; Messrs. R. E. Snowden and R. P. Coble of the State Highway Commission; Messrs. D. Tucker Brown and John D. Waldrop of the North Carolina Good Roads Association; Mr. J. B. Clingman, Highway Engineer of Madison county; Mr. Nello L. Teer, road contractor; Mr. A. R. Williamson, representing the R. G. Lassiter Contracting Company; Mr. James Mullican, superintendent of road construction in Davidson county; Mr. R. A. Burnett, road superintendent of New Hanover county, etc. There were representatives of the Good Roads Machinery Company, Wyoming Company, Smith & Sons Manufacturing Company, Austin Brothers, the Barber Asphalt Paving Company, Pomona Terra-Cotta Company, Southern Metal Culvert Association, and Association of Portland Cement Companies.

Some of the points of interest brought out during the lectures and discussions of the institute are given below:

### Work of the Institute.

The work of the institute was outlined by Director Pratt as being "a clearing house for road problems in North Carolina." He emphasized the fact that we have passed the initial stages of road building in this state and have reached the point where we want to get actual results from the appropriations which have resulted from the educational campaign, which has been waged for good roads throughout the state for the past ten years. It is of especial importance at this time that the state, counties, and townships get together in

the inauguration of not only the most improved methods for road building but in bringing about systems of highways, as a state system, a county system and township systems, in view of the fact that the chances are that the federal government will make a large appropriation for road building and that North Carolina will be in a position to take advantage of something like \$640,000.00 a year of such a fund. It is the belief of Mr. Pratt that the state should so build up and strengthen its Highway Department as to be in full accord with all of the provisions called for in the federal law, so that North Carolina will be in a position to take full advantage of such funds when made available.

#### State Highway Commission and Its Relationship to County Work.

Mr. W. S. Fallis, state highway engineer, then discussed the State Highway Commission and its relationship to county road work. He gave a brief history of state road organizations in other sections of the country and explained in detail the cooperation which may be had on the part of the counties from the State Highway Commission as authorized by the law establishing this commission.

Mr. Fallis emphasized the fact that North Carolina is in a better position than many states to the north to secure a system of well located roads because she is a rural state and not so very thickly populated at the present time as some of her sister states. This fact makes it possible to relocate many of the old roads which have been established by custom and habit and which, if not relocated at the present time, will become more and more a burden to the communities through which they pass. He impressed upon the engineers present the importance of securing the very best possible location for every road they attempted to construct, emphasizing the necessity of proper location as to grade as being the primary consideration. Mr. Fallis urged upon the road men, particularly the commissioners, not to spend their bond money for the temporary part of the road i. e., for surfacing roads, but for the permanent part, the location, grade and drainage. "Traffic conditions, even in a short while, may demand different grades of surfacing materials, but if the road is properly located, graded and drained in the first instance, the problem of the right kind of surfacing will take care of itself and as traffic increases and the neighborhood becomes more thickly populated, the amount of money available for surfacing will become greater each year."

#### Welcome to University.

In the absence of President Graham who was called away, Dean Stacy extended a very warm and hearty

welcome in behalf of the University to those attending the institute. One point brought out by Professor Stacy was that the supreme court of North Carolina has laid down the principle not only that "public roads are public necessities," but that "good public roads are public necessities" and that in order to get good public roads, it is lawful for the commissioners of a county to resort to bond issues which provide the machinery necessary for getting good roads in any county desiring them. Mr. Stacy said: "If then, not only roads are a necessity, but good roads are a necessity, it is imperative that the men who have charge of the location, construction and maintenance of public roads be efficient and know how to construct and maintain these roads economically."

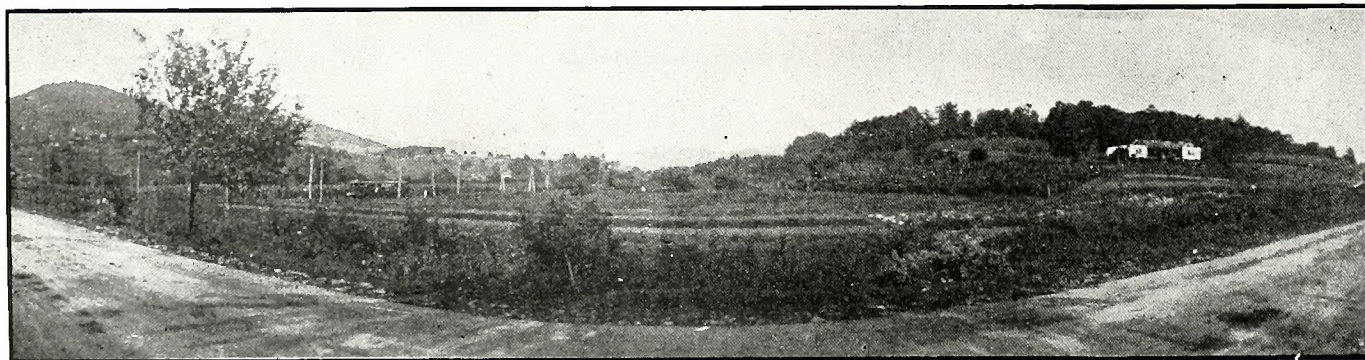
#### Road Maintenance.

Road maintenance was given a large space on the program inasmuch as a good portion of three days was devoted to lectures, discussions and demonstrations of methods in road maintenance.

In introducing the subject, Mr. Pratt said: "I want to make a distinction between maintenance and repair of roads. Repair comes first, if the road has not been kept in good condition. After a road has been put in good condition, then there is no need for repair unless maintenance is neglected. Steady and intelligent maintenance will do away with repair bills and in the end is much cheaper than repair or construction." Mr. Pratt advocated "that no county or township shall be given authority to issue bonds for the construction of roads without making provision that the money shall be spent in the supervision of competent highway engineers and that adequate provision for the upkeep and maintenance of those roads that they are constructing."

Mr. D. H. Winslow, senior highway engineer in charge of maintenance of the U. S. Office of Public Roads and Rural Engineering, then began a series of lectures on the subject of maintenance, particularly with reference to the patrol system. Mr. Winslow is in charge of the maintenance of a section of the National Highway extending from Petersburg, Va., to Fayetteville, N. C., and has been most successful in maintaining this stretch of highway through the patrol system, at an exceedingly low figure. In most of the North Carolina counties through which this road traverses the maintenance runs \$60.00 per mile per year. Mr. Winslow is an exceedingly practical man and gave the students at the institute many points which will undoubtedly be of much value to the road work of the state, such as:

Daily inspection of roads, particularly on rainy days to locate all pond holes; use of road drag immediately after rain; use of road hone to supplement the drag;



Farm of Walter Toms Wray—Asheville-Weaverville Highway—Asheville, N. C.

importance of filling all holes with good material of the same type as used in the construction of the road, keep ditches and outlets free at all times; removal of dead trees, tin cans, bottles, nails, etc., from the road bed; renew all defective planks on bridges and culverts when necessary; get all rough places out of the road by use of a spike-toothed harrow used while road is wet, on sand-clay, topsoil or gravel surfaces; cut weeds from both sides of road; use mowing machine when practicable; cut all brush on inside of curves, railroad crossings and culverts; removal of ridge between wheel ruts and gutter by using one-horse cultivator and then using drag to push the material toward the ditch; paint all guard rails of culverts and bridges which will prolong the life of these rails and render them more sightly; renewal of all sign boards, mile posts, etc., when necessary, as these are of great importance to the traveling public; see that all labor and teams render full and satisfactory service.

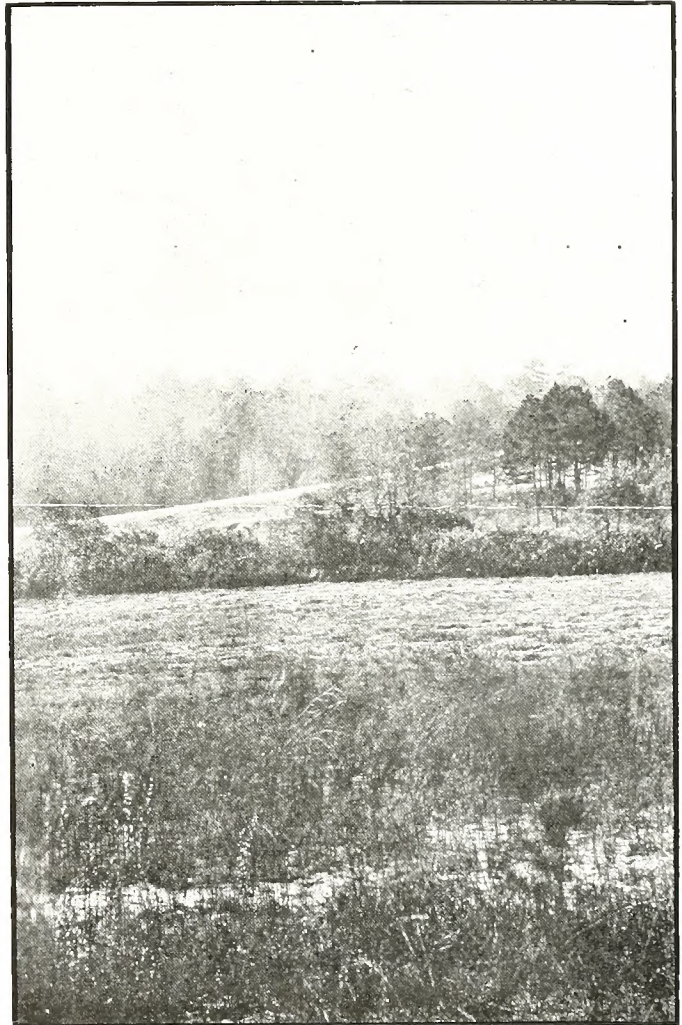
One of the difficulties which Mr. Winslow has encountered in his maintenance scheme has arisen from the kind of traffic and increased traffic over this highway, due to its improvement through this system of maintenance. The automobile and the automobile truck have become very frequent and in many cases the maintenance money has to be diverted from the road surface to the maintenance of the floors of bridges and to the reconstruction of small culverts which are inadequate to stand this new form of traffic. Thus it will be seen that the actual cost of maintaining the road is much less than the allotted sum.

Mr. Winslow states that local officials have been so well pleased with the improved method of maintenance along this highway that in many cases they have voluntarily raised the salary of the foremen and patrolmen along the route.

Another point brought out by Mr. Winslow was the fact that when he first took charge of this highway there was no method for accounting for work done and he has worked out certain forms which are filled out each day by each patrolman and sent to Mr. Winslow and in this way he is able to keep in close touch with the condition of the road throughout its entire length. Mr. Winslow has made it a rule to secure competitive bids on all materials which amount to more than \$50. By doing this, in a bill for culverts, amounting to \$124.00, the difference between the high and low price made was \$79. A saving of 40% on a small bill of this kind shows the efficacy of this method. In his work in the various counties he has found that there has been no systematic accounting of the road funds and in no instances has he found a board who can tell how much any particular road cost, either as to its construction or maintenance. By establishing such an accounting system, an engineer or superintendent can render an exact statement of the road expenditures which will create not only an interest in road affairs among the public generally, but will make the public feel that their money is being carefully and economically spent. Mr. Winslow advised the engineers and superintendents to get in close touch with the people of a community, entering into their life and suggested ways of improving portions of roadways and homes, which would make a section of country more attractive to its inhabitants and to the traveling tourist.

Another very important point brought out by Mr. Winslow is the necessity of counties or townships purchasing road material pits near their roads as bases for future supplies. Such pits can be had at the present time at a reasonable figure, but as our rural sections

become more thickly populated these pits will become more and more expensive and in many cases could not be had at all. In view of the fact that the sand-clay road will be used in the rural sections of North Carolina for many years to come, this is a point to which very serious consideration should be given by the boards of county or road commissioners. Mr. Winslow suggested that the county officials in this state start a custom which is now being used in Pennsylvania and some of the other states of subscribing to one or more good



New Road About Stone Mountain, Ga., on Washington-Atlanta Highway. Taken Nov. 1915

roads magazines for the use of their road officials. He states that the resulting benefit to the road engineers, superintendents, etc., would more than justify the expense.

A full digest of Mr. Winslow's talks would be too long for an article of this nature, but it will be included in the proceedings of this institute and would serve well as a text for any officials who are in charge of the upkeep or maintenance of our public roads.

Many points which Mr. Winslow brought out were well illustrated by those who took part in the demonstration of the use of the road drag, the road hone and other types of road machinery during the afternoons.

Mr. W. A. McGirt, chairman of the board of county commissioners of New Hanover county and Mr. R. A. Burnett, road superintendent of New Hanover, gave some figures and a brief outline of the use of the pa-

trol system in that county in the maintenance of their highways. This is the first county in the state to undertake a system of patrol maintenance as a county and the success which they have met is a guarantee of what might be accomplished through such a system of maintenance in many other counties of the state.

#### Road Location.

The question of road location was taken up by Mr. A. D. Williams, state road engineer of West Virginia and there were further discussions by Mr. Coble of the State Highway Commission and others. Among the other things Mr. Williams said: "There are many things upon which the surfacing and successful location of a road are dependent. The neglect of any one of these may materially reduce the efficiency of your improvement. By efficiency we mean service; not always durability. A road may be durable and not serviceable. For instance, we may put a surface of concrete or asphalt on a road of 20 or 30% grade. There is no question but what that road would be durable because we could not use it under many conditions, yet it would certainly not be serviceable. To be of value to a community, a road must be serviceable and then if we have the enduring part done properly, that is its location, we have acquired the maximum efficiency and value for that road. It has been said that location, grade and drainage are the only three permanent things about a road and it may further be said that grade and drainage at an equitable cost can only be had through proper location. We can put in drainage at a cost sometimes that is excessive, yet if the road were located different the problem of drainage would be entirely different..... It (the locating of roads) is one of the biggest problems that confronts us today. There is no man who can go into the field of highway work in any capacity, who means as much to a road and to the future of a community as the road engineer. It does not make any difference what may come afterwards, how great an expert may be secured, if the locating engineer has made a mistake that mistake is going to be a millstone around the neck of progress of that community forever."

"Another problem we must consider is that every year we live, a road after it is located becomes more and more and more a fixture by reason of people building upon it, laying out farms and property lines so as to suit that particular location....."

Another thing to be considered is the class of traffic that you have to deal with on a road. If your traffic is going to be motor traffic, the grade should yield to alignment; if horse drawn, then alignment should yield to grade, but it appears to me at the present time that we must look out for both kinds of traffic on our roads. None of our highways for the next forty or fifty years, unless greater changes come about than we figure on, will be other than those used by the two kinds of traffic. We will have to strike what we call a happy medium and get the best alignment we can with the funds available and at the same time the best grade..... The direction of your traffic should control to a certain extent your grade."

Mr. Williams also discussed the relationship of superintendents and engineers to the highway commission and county road work and its relation to state work. These discussions were of particular interest at this time because of the comparatively recent inauguration of a state highway commission in North Carolina.

Colonel John N. Ambler, consulting engineer, dis-

cussed the essential qualifications of a highway engineer. The essentials which he enumerated are:

"Knowledge of how to finance the work and how to secure proper legislation.

"Knowledge of how to finance the work and how to secure proper legislation.

"Knowledge of the type of road as to location, grade, curvature, width and material of surface to best meet the means and needs of the people in any case.

"Knowledge of how to pick out the route for a road or system of roads and how to locate them on the ground and stake them out for construction.

"Practical knowledge of the details of construction, such as drainage, crown, grading, ditching and culverts, as well as the type of surfacing material, whether it be topsoil, sand-clay, concrete, asphalt, brick or macadam.

"Knowledge of maintenance, upkeep and financial administration, as well as the relative conditions of construction work as done by convicts, hired labor or by contract.

"Knowledge of bridge design and construction, as well as of the varied manifestations of trickery so often incident thereto."

Mr. Pratt took up the question of the selection of surfacing materials for highway construction and Mr. Coble carried out this discussion by a talk on "The Selection of Sand-Clay and Topsoil for surfacing;" also of gravel. Mr. Fallis, State Highway Engineer, took up the question of surfacing materials for macadam roads and concrete roads and Mr. Robert James of the State University spoke on "Bituminous Materials for Surfacing."

Professor T. F. Hickerson of the State University, in connection with culverts and bridges, discussed the "Area of Waterways" and Mr. J. A. Porter of the Pomona Terra-Cotta Company described the use of the segment block culvert in road work, illustrating his talk with segment blocks and by a culvert constructed from this material for the benefit of the institute.

There were technical discussions of the various forms of bridges and culverts, as well as certain types of road machinery, as the steam shovel, etc.

An illustrated lecture was given by Mr. Gny G. Mills, representing the U. S. Portland Cement Association. This type of road is just beginning to be used in North Carolina and the importance of such a discussion can be readily seen when we realize the necessity for our road men to learn proper methods of using cement where traffic conditions demand such an expensive surfacing material.

It was with regret that the institute learned of the enforced absence of Honorable John H. Small, Congressman from the First District, who was expected to address the Institute Thursday evening.

In view of the services rendered by the North Carolina Congressmen, in connection with the Shackelford Bill, which was up before Congress, the following resolution was passed:

"Resolved that our thanks are due and are hereby tendered to Senator Simmons for resisting the further delay of our long cherished desire for the enactment into law of Government aid in building and maintaining good roads; and our thanks are also tendered our Representatives in passing a bill through the House."

Bell county, Texas, good roads boosters have organized for the purpose of completing the 60-mile loop to connect with the government post road from Austin to San Antonio.

# Highway Construction and Natural Resources of Swain County, N. C.

By K. E. BENNETT

SWAIN county is to "get out of the mud," the day that we have been waiting for has dawned. Until the spring of 1915 there was not a mile of graded or improved road in this county. Before this time there was very little interest in favor of improved roads and interest did not develop until the proposed Asheville-Murphy-Atlanta Highway was being discussed by our neighbor counties, namely Jackson and Macon, proposing a route from Sylva to Franklin over the Cullowhee mountain entirely isolating Swain county from the highway. Realizing our great resources and location we felt that it would not only be an injury to us, but it would be preventing the public at large from enjoying the beautiful scenery which is to be found in the "Eden of the Hills."

A few of the leading citizens made trips to Sylva and Franklin at meetings held in the interest of the good roads movement and after many difficulties, finally convinced our sister counties that the route through Swain County was not only essential but practical. We then and there pledged ourselves to secure sufficient funds to complete our link in the scenic highway. Therefore a bill was passed in the General Assembly creating a road district, known as the Swain Road District. Under this act the following citizens were appointed to serve as highway commissioners, to wit: A. S. Patterson, Dr. R. A. Bennett, J. E. Colburn, T. M. Jenkins, J. L. Floyd, Frank R. Fry, R. J. Roane, A. L. Epps, and W. M. Quiett, who under this act issued bonds to the amount of \$200,000.

They elected Mr. T. M. Howerton, as Chief Engineer, who immediately took up the work and actual construction was started May the 17th, 1915 by Reed & Wells Construction Company of Asheville, they having received contract for the first work in the county.

## Overcoming Difficulties.

The difficulties to be overcome in road construction in this part of Western North Carolina, are so far greater than in the Eastern or piedmont section, yet the citizens of the extreme western counties are getting to be the most enthusiastic advocates of good roads to be found anywhere in the state. It required considerable time to get the good roads germ established, but since it has been established, there is nothing that can keep it

from spreading over this entire western country, and is only a question of time before all of our roads will compare favorably with the best. The scenery on the proposed Asheville-Murphy-Atlanta highway is unsurpassed, making it a very desirable route for tourists motoring from Asheville to Atlanta, who have only seen the beauties of the mountains of western North Carolina from the windows of trains at a distance.

To-day there is completed and under construction in Swain county alone, thirty-five miles of highway, twenty-two miles of which is a link in the Asheville-Murphy-Atlanta highway which enters the county at Whittier on the Jackson county line near the Shallow Ford.

Intersecting this highway there is a road under construction to Cherokee, connecting with the Jackson county line at that point. About four miles below Bryson City there is a road under construction to Almond, which will in all probability in the near future be extended up the Nantahala Gorge, connecting with the Cherokee County line at Tipton, thereby shortening the distance between Bryson City and Murphy or Atlanta, by at least twenty-five miles.

A road is being considered seriously from Cherokee up the Oconaluftee river, to the Tennessee line, making a direct outlet from Bryson City to Knoxville and points further north. This will change the tourist tide from the other routes and bring them through this way, if for no other reason than the beautiful mountain views, besides it is much nearer from Knoxville through this course to Atlanta and other southern winter resorts, than on the Dixie Highway Route.

## Citizens Behind Movement.

As stated previously there is no place which offers any more obstructions to road building than does this part of the state, especially Swain county, but the citizens to a man are heartily behind the movement, and while there are numerous streams to cross and steep mountains over which the highway passes, when finished the road will be ideal for travelling, and a person travelling through this country will hardly notice the ascent or descent of grades, as they are all under 4½ per cent.

There are completed and being constructed over this highway eight different bridges of reinforced concrete



First Road Construction Started in Swain County, N. C., May 17, 1915. By Reed & Wells Construction Co., Asheville, N. C.



Some Scenery Along Highway Now Being Constructed in Swain County, N. C.

construction, which are magnificent in design and construction, this work being let to C. W. Requarth Company of Charlotte. While the Commission realizes that the first cost of concrete structures is more than steel, it is considered economy in the end, as there will be no upkeep cost to contend with, and the slogan of the Swain County Highway Commission in the road work has been from the beginning, "Durability, Service, Ability, and PUSH."

The resources of Swain County long unrecognized by the outside world as well as by the local citizens, will be forced forward by this good roads movement, until people who have never heard of Bryson City and the surrounding country, will be wanting to investigate. Besides the natural resources, Swain county has about one hundred miles of railroad in operation and more being constructed.

#### County of Fine Resources.

There is a copper mine in the county valued at about two million dollars, also the largest tract of hardwood timber in the state which will shortly cause to be established in Bryson City, a large lumber and hardwood plant. Besides the lumber and timber industries already in operation in the county, there is also excellent prospects of a large pulp mill being located here. The bulk of the tale used in the United States comes from the North Carolina Tale and Mining Company's mine at Hewitts in this county. The finest marble to be found anywhere is here in vast quantities. The water power is unlimited, there now being constructed a development which will supply about four hundred thou-

sand horse power, this being only the beginning of a development, involving millions of dollars, which means the harnessing of the Little Tennessee River for a distance of fifty or sixty miles. The resources have been here since the beginning of time, but the good roads movement must be credited with giving the resources a chance to prove their worth.

#### American Roads Lead in Beauty.

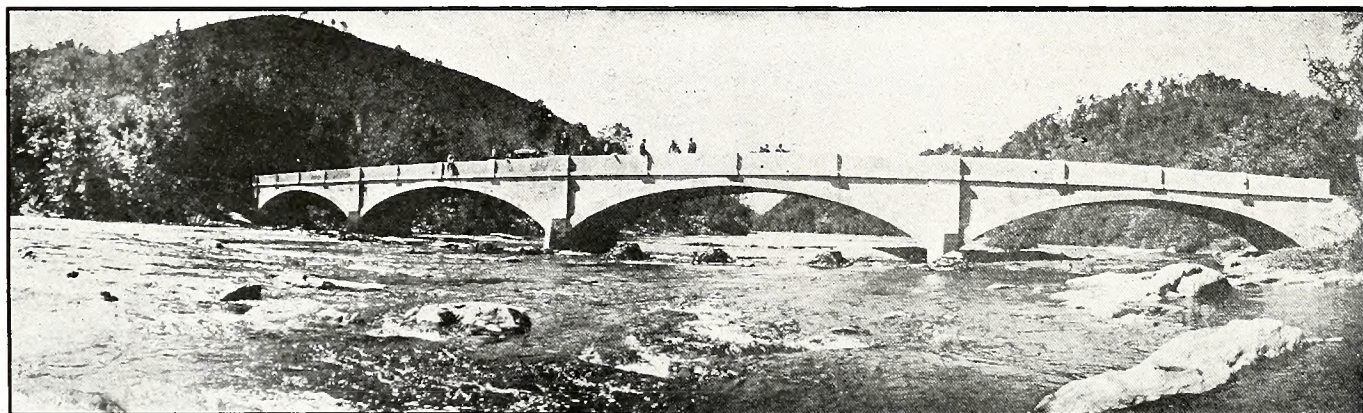
Earle C. Anthony and R. E. Olds have started a campaign for good roads among the owners of Reo cars.

While the main traveled highways and "trunk lines" in California are being developed by the state there are many by roads that would easily be improved by enthusiastic concerted action. This condition exists all over the United States, and it is proposed to enlist the great army of Reo owners in behalf of the movement. Education as to the value of the roads America has will be one of the objects of the move, according to Anthony, who says:

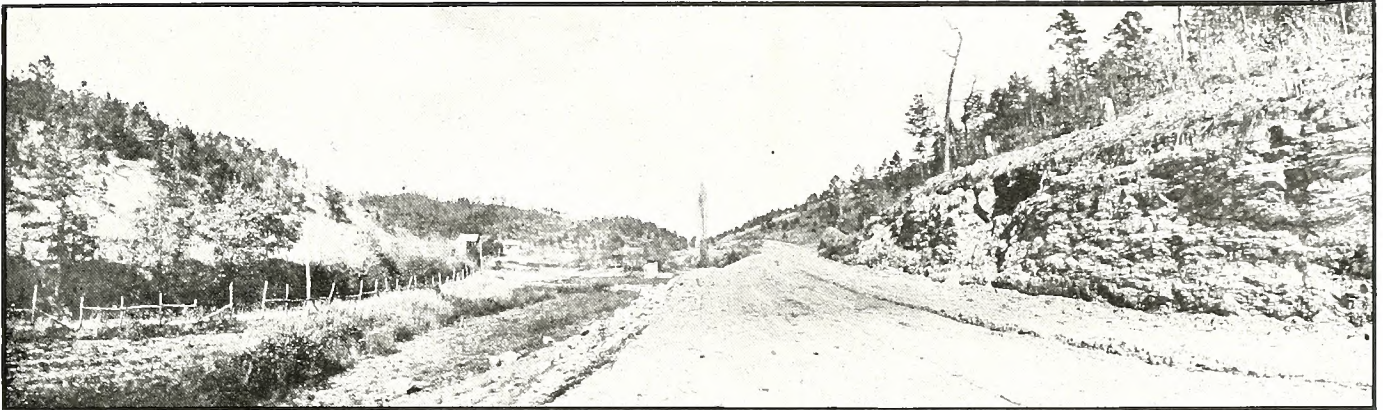
"We are accustomed to saying that we have the worst roads in the world, and to hold up as an example of model roads the centuries-old highways of Europe

"Of course we are very careful to select which European countries we will use. And in doing so we very carefully ignore Belgium, Holland, Scandinavia countries, Russia, the Balkans, Turkey, etc.

"That reduces it down to the British Isles, France, Germany and Italy. And then we reduce it down again so that it covers not all the roads of even those coun-



Three Hundred Foot Reinforced Concrete Bridge Over Tuckaseegee River Near Bryson City, N. C.  
Constructed by C. W. Requarth Co., Charlotte, N. C.



Comparison of Old Road and New Highway, Swain County, N. C. (Old Road Shown at Left of Photograph)

tries—only the main traveled roads. The ‘trunk lines’ as it were.

“I have found in talking with Americans who have toured abroad that most of them will give as examples of model highways a few main traveled roads. But ask them about the general roads of any country and they do not know, or if perchance one has happened to lose his way and gotten on to one of the byways, he will admit that they are about as bad as he has ever seen in Michigan or Nebraska.

“In Texas, there’s a road running from Galveston to Houston that reminds one of the white highways from Genoa to Pisa. Both are as smooth as a floor and as white as now.

“The Texas road, made of crushed sea shells which make a perfect surface, while the Italian road is composed of powdered marble from the great quarries of Carrara. Anyone who has traveled over this well knows he will not return that way because its beauty is deceptive. The gritty particles of marble will cut the tread off a set of tires in one trip.

“In California there are more roads and better roads than in all the famed Rivas, while in our sparsely populated western states, bad as they are, they compare most favorably with those of many European countries in which, because of the ‘older civilization’ that is supposed to be there, one would expect to find roads that were passable instead of merely mountain trails.

“Our distances are vast, and we overlook the fact that we have had only a short time in which to build more good roads than any other people ever built in the same length of time, and it will not be many years until America will lead the world in good highways.”

Illinois has stepped from the mud and is fairly started upon one of its greatest and most important enterprises, that of building good roads, says Governor Dunne, in part:

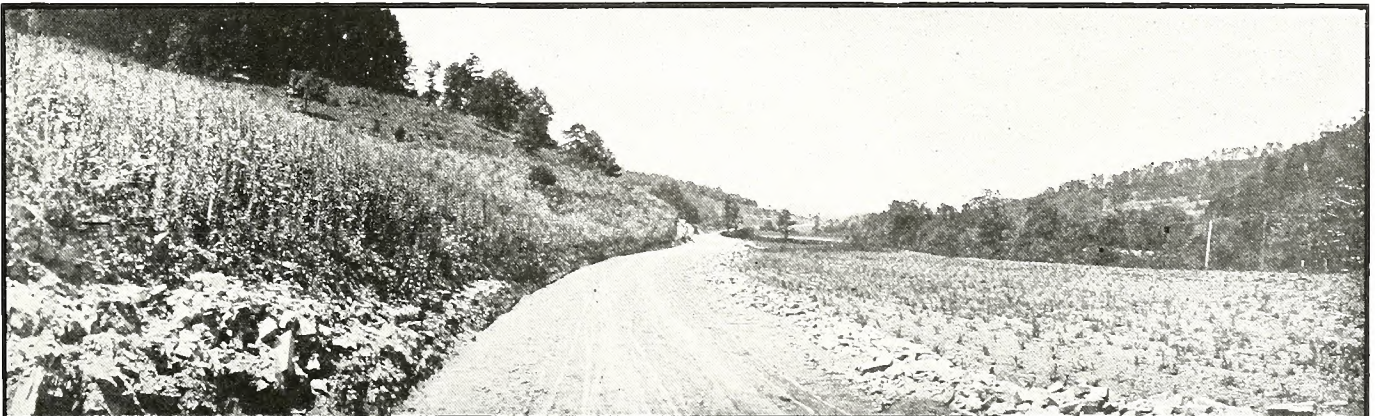
“Property owners, land owners, city and country people alike, have come to see and understand what a tremendous economic and social loss was entailed by our poor roads. Since the Tice law became effective July 1, 1913, the General Assembly has appropriated a total of \$3,100,100. The counties will have matched this amount, making a total of \$8,200,000 available for state aid roads up to June 30, 1917.

“The Illinois system of state aid roads comprises 16,000 miles, or about 17 per cent. of the total 94,000 miles of highway. Of these 94,000 miles 9,000 are improved. If we assume that 3,000 of these 9,000 miles of improved roads are included in the 18,000 miles of the state aid system we have left 13,000 of the system yet to be constructed.

“The state highway commission estimates the cost of this construction to be \$129,000,000. Spread over twenty years this would require \$6,450,000 annually. Estimating the assessed value of the state for the next twenty years at an average of \$3,000,000 per year, the state aid roads will cost the tax payer 215 per \$100 of assessed valuation.

“The system of state aid roads as laid out by the counties and finally approved by the state will connect the cities and villages of each county and the cities and villages of all other counties.

“At the close of the year 1915 there had been completed 115 miles of hard roads. Eighty-one bridges have likewise been built. During 1916 we expect 470 miles of state aid roads to be built.”



Road After Construction, Swain County, N. C. Reed & Wells, Contractors

# Good Roads Photographic Contest

**\$2,600 in Prizes Offered by National Highways Association to Secure Exhibit Picturing Roads Good and Bad in the Nation**

A NATION-WIDE photographic contest in the interest of the "Good Roads Everywhere" movement, with cash prizes of \$2,600 open to everybody, has been announced by the National Highways Association.

Colonel Theodore Roosevelt and the two well-known writers, Miss Ida Tarbell and Mr. Mark Sullivan, will serve as judges in the contest.

The photographs selected in the competition will be used to establish in Washington a national exhibit on the good roads problem designed primarily to promote a nationally conceived scheme of highways.

In connection with the pending legislation in Congress to have the federal government shoulder a part of the task of "good roads" construction, the National High-

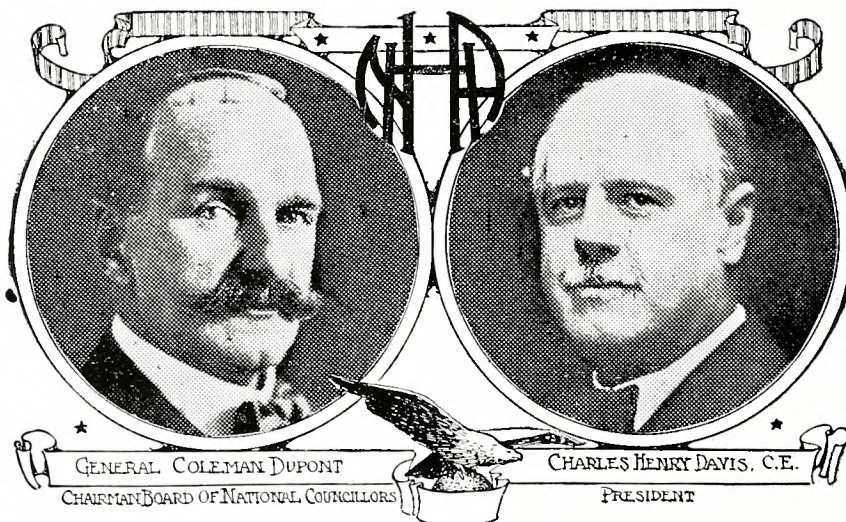
ways Association will be 5 second prizes of \$100 each, 20 third prizes of \$25 each, 40 fourth prizes of \$15 each, and 100 fifth prizes of \$5 each, making 166 chance in all for each person entering the contest.

The competition will be kept open for eight months, closing at noon, Tuesday, November 7th. All photographs should be addressed to "Good Roads Everywhere" Photograph Contest, National Highways Association, Washington, D. C.

## Discusses Photographs Desired.

Discussing the photographic contest on Good Roads, General du Pont of the National Highways Association said today.

"The purpose of our Association in this matter is to see to it that, when Uncle Sam enters upon this work



**OFFICERS OF NATIONAL HIGHWAYS ASSOCIATION WHO SUBSCRIBED FUNDS TO CARRY ON PHOTOGRAPHIC CONTEST**

ways Association, it is explained, desires to have adopted a plan for a system of national highways, surveyed and located by expert engineers, so that federal funds will not be spent in a hit or miss "pork barrel" fashion, but in accordance with a scientific plan as any railroad is built or as the Government itself did in the case of the Panama Canal.

By means of the photographic contest it is proposed to gather a complete picture of the good and bad road problem as it exists in every section of the country, and this the Association will use in its effort to obtain scientific "non-pork" legislation from Congress.

## Prizes to Be Awarded.

The cash prizes of \$2,000 were subscribed by General Coleman du Pont, Chairman of the Board of National Councilors, and Charles Henry Davis, President of the National Highways Association. The competition will be known as the du Pont-Davis Road Photograph Prize Contest.

The first prize, to be given for the most striking (good or bad) road photograph, will be a \$500 cash award. In all there will be 166 cash prizes awarded.

of road building, he starts off on the right road. The "good roads" issue is a national problem as well as a state and county problem. Whatever the federal government does in this matter should be done on a national basis—upon a plan nationally conceived.

"Every member of Congress knows the "good roads" problem in his district or State, of course, but we want to have him know it nationally.

"We have inaugurated this photographic contest as a first step in this direction and we believe that with the assistance of all Americans interested in the good roads problem we can make it a very important step. An exhibit of photographs picturing the good roads problem as it exists in every section of the country will make a most graphic and forceful lesson.

"We want the subjects of the photographs in this contest to demonstrate not only how bad roads are, and how good they can be made, but also what it means to the welfare of every man, woman and child in the United States to have good roads. For instance, we all know that a country school house located in a district of good roads has far better attendance of pupils,

and for that reason can offer them educational opportunities than a country school in a district of bad roads.

"Consequently it would be of great value in our contest to have photographs giving a picture lesson to the eyes of our law makers of what it means to children in our rural districts to have their school house located on good roads. This is only one idea that has come to me. There are hundreds of such lessons on the value of good roads which can be taught by photographs.

"Perhaps the best way to do this is through photographs contrasting good and bad road conditions. We

will arrange our exhibit to do that, but in order to allow individual competitors to take advantage of some such striking contrast as may have come to their attention, the Association has not limited competitors to one photograph, or to one prize. Each competitor can send in as many photographs as he wishes, and he will get as many prizes as his work deserves.

"Photographs will be judged first upon their merit in strikingly emphasizing road conditions (good or bad), second in their pictorial interest, and third in their photographic excellence."

## The Jackson Highway

By MISS ALMA RITTENBERRY

Patroness Jackson Highway Association

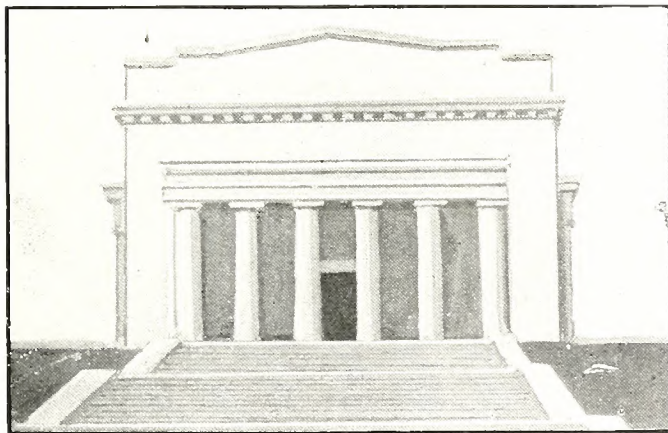
**I**N A RECENT issue of the Springfield Republican there is an editorial on Continental Highway; commenting it says, "The Romans constructed their roads to last, so that their foundations still underlie English roads. The lesson the Romans taught may well be taken to heart in the United States, where road building is almost a mania. We all know that roads laid on substantial foundations are the most economical in the long run, no matter how much higher the cost, because they are laid to stay. All that is needed in such cases is to keep them in repair, and repairs are comparatively inexpensive. Such roads will last not merely through decades but through centuries. From this point of view, automobiles are not immediately helpful, because motorists demand passable roads at all times, but the states and the communities may well build for

over the route and is very hopeful of its early completion.

The Lincoln Highway has the backing of the Automobile Manufacturing Associations. Mr. Joy is President of the Packard Car Company.

The Dixie Highway had its birth at a good roads meeting at Atlanta, Ga., in November 1914. Many of those who helped to launch the Lincoln Highway Association at Indianapolis in October 1912 are interested in the Dixie Highway. The Dixie Highway has two loops, one from Detroit down through Cincinnati, eastern Kentucky through Knoxville, Tenn., to Chattanooga, over to Atlanta, down through the "Heart of Dixie" as Georgia has especially named the central portion of her state, on down to the east coast of Florida. The other loop starts from Chicago, follows the Wabash to Terra Haute, to Indianapolis, to Louisville, through Elizabethtown, Ky., Bowling Green, through Nashville, joining the main line of the Dixie Highway at Chattanooga. There was much contention and excitement in the whirlwind campaign that was brought about in locating the Dixie Highway route.

The latest organization to take a concrete form is



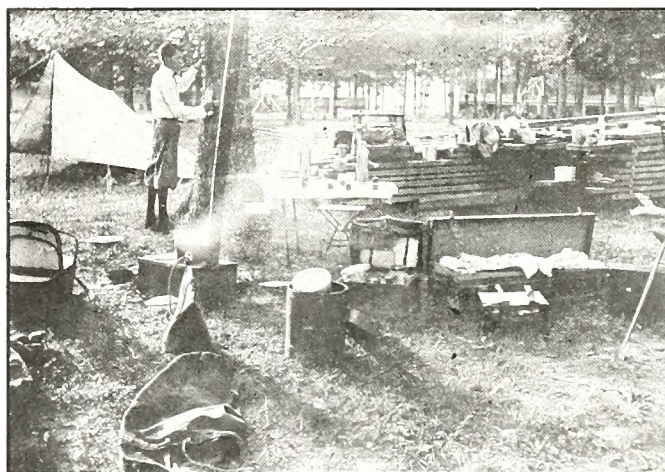
Lincoln Memorial Hall, Lincoln Farm, Kentucky

the future and not altogether for the present, even though automobilists are temporarily inconvenienced at times.

"The United States is engaged in building Continental Highways, just as in the old days we constructed our railroads across the Continent."

The most important Continental Highway, the Highway most talked about for the last three years, is the Lincoln Highway from New York across the Continent to San Francisco. Mr. Henry B. Joy, of Detroit, being its President. It is the longest Continental Highway in the world and it will soon be an ideal road from the Hudson River to San Francisco Bay.

Mr. Joy has just recently completed his annual tour



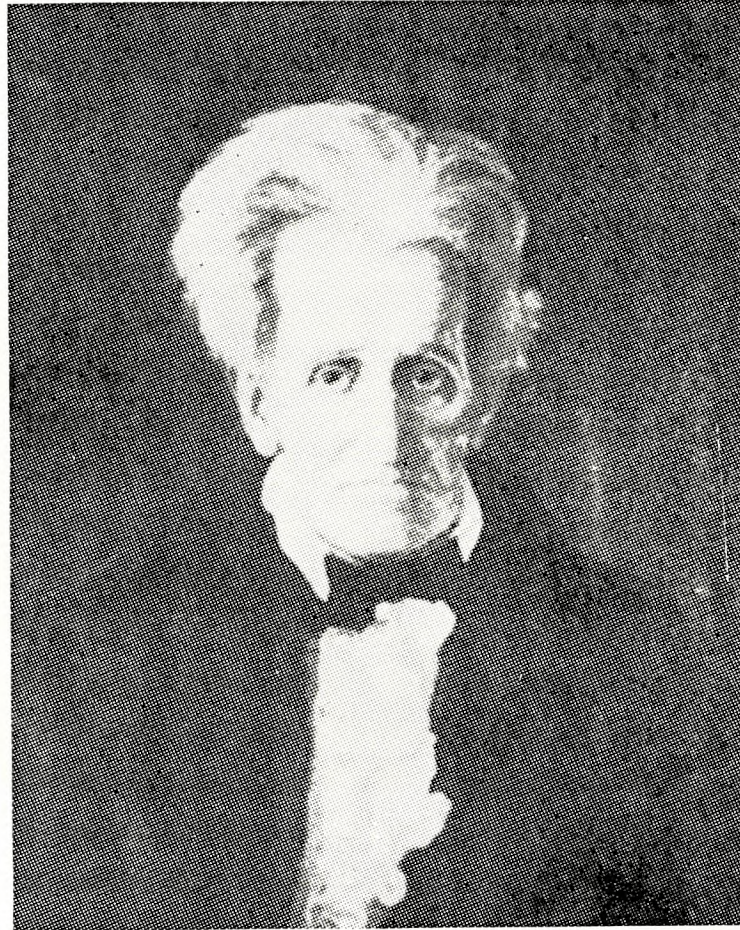
An Automobile Camping Party at Mammoth Cave, Kentucky

the Jackson Highway Association which was launched under most promising auspices in the auditorium of the Birmingham Chamber of Commerce at Birmingham, Ala., July 30th, 1915, in which Mr. P. L. Atherton, of Louisville, Ky., was made president. For four

years the Jackson Highway from Chicago to New Orleans has been agitated as a monument to Andrew Jackson. Eight National Highways had been proposed in Congress in 1910 as monuments to eight of our most famous presidents but not one to Andrew Jackson, whose name is identified with more roads and trails than any other in American history. The idea of a North and South Highway as a monument to Andrew Jackson originated at a National Good Roads Convention held in Birmingham, Ala., May 25th, 1911. The plan and purpose of this trunk line road from the Lakes to the Gulf, splitting the Middle Basin, has been kept alive by the persistent effort of a few members of the

a Lincoln and a Jefferson Davis. Had American History but these three names it would fill a glorious page but Kentucky has given "My Old Kentucky Home," "The Kentucky Cardinal" and "Proctor Knott." It will go on through Tennessee, by the Hermitage, where Andrew Jackson lived and died. It will pass through Nashville, beautiful for situation—it rises gracefully above the bluffs of the Cumberland River to be crowned with its capitol. James K. Polk, the eleventh President of the United States, lies buried in the Capitol Grounds.

The Jackson Highway passes on down "The Pike of Battles" to Franklin. There is death in every mile of



Andrew Jackson, in Whose Memory the Jackson Highway is Being Built

National Society United States Daughters of 1812 state of Alabama.

#### The Route an Ideal One.

The route of the Jackson Highway is an ideal route. It is an historic route. Beginning at Chicago on Lake Michigan, where the whitecap waves laden with commerce never tire of going to and fro to every land and clime, Chicago the city that is called the "Mixing-Bowl" of the nation, the Jackson Highway passes on down through Indiana over a road that has been in use a hundred years for the traveler going south, an historic road trod by a Rodger Clark or Henderson "When Knighthood Was in Flower," the home of Hendricks and "The Gentleman From Indiana," and that "Old Sweetheart of Mine," who used to pass by the "Old Swimming Hole Going Out to Aunt Mary's," it will go over the old Louisville and Nashville turnpike, famous in history and story, through Kentucky, "The Dark and Bloody Ground" that gave birth to a Clay,

this Pike. It was a battle ground of the Confederacy, a turning point in its history. It was on this Pike and the Mt. Pleasant Pike, that runs also from Columbia through the "garden spot of the world," that Buell made up the hours that saved Grant's army at Pittsburgh Landing that Sunday night on April 6th, 1862, which made Grant a President instead of a prisoner and welded two sections into one glorious nation. On what little things do the destiny of men and nations seem to hang!

The Jackson Highway passes through Columbia, a gem set in the Blue Grass Section, on down to Pulaski, the home of Sam Davis, "The Boy Hero of The Nation." Pulaski, noted in Ku Klux Klan history, over beautiful Elk River, the hunting ground of Davy Crockett, through Athens, Ala., across the Tennessee—the river of the Big Bend—to Decatur, which preserves the name of Stephen Decatur, on down through the mountains of North Alabama to Birmingham, "The

Magic City of the South," in the great county of Jefferson, named in honor of one whose name is inseparably linked with the greatness of our country's history, on down through Montgomery, the "City of Memories" where the flag of the Confederacy was first flung to the breeze, through the county named in honor of Major Montgomery, the brave Virginian, who at the age of twenty-eight yielded his life in the defense of his country at the Battle of Horse Shoe Bend. When the Battle was ended General Jackson stood over his body and wept. He exclaimed: "I have lost the flower of my army." The Highway will go down over sparkling streams, by cotton fields, dotted with the cotton pickers—the negro, onto the beautiful city of Mobile, on beautiful Mobile Bay, a city founded on and made glorious by historic events, defended against the British during the war of 1812 by Andrew Jackson, who in 1821 took possession of the territory ceded to the United States by a treaty with Spain made in 1819.

transferred to the exclusive possession of cultivated man."

"A pupil of the wilderness, his heart was with the pioneers of American life towards the setting sun. No American statesman has ever embraced within his affection a scheme so liberal for the emigrant as that of Jackson. He longed to secure to them not presumption rights only, but more than pre-emption rights. He longed to invite labor to take possession of the unoccupied fields without money and without price; with no obligation except the perpetual devotion of self by allegiance to its country. Under the beneficent influence of his opinion, the sons of misfortune, the children of adventure, find their way to the uncultivated west. There in some wilderness glade, or in the thick forest of the fertile plain, or where the prairies most sparkle with flowers, they, like the wild bee which sets them an example of industry, may choose their home, mark the extent of their possessions, by driving stakes or



"Hermitage," Home of Andrew Jackson

Mobile, the home of Father Ryan, the Poet Priest, and of the hero of the Alabama, Admiral Semmes.

The Jackson Highway will go on by Biloxi, Gulfport, across bayous, darkened by the long shadows of trees draped in the soft gray moss, that weird parasite that has not root or beginning and no perceptible end. It evinces no process of growth but surely, silently weaves, decades after decades, its strange fabric, and enlists the gentle night winds to arrange its graceful festoons with no apparent scene or design. On, freighted with the perfume of the jessamine and the magnolia, to New Orleans, where Andrew Jackson in command of the American forces fought the memorable Battle of New Orleans, January 8th, 1815, which settled for all time English domination and interference in American affairs.

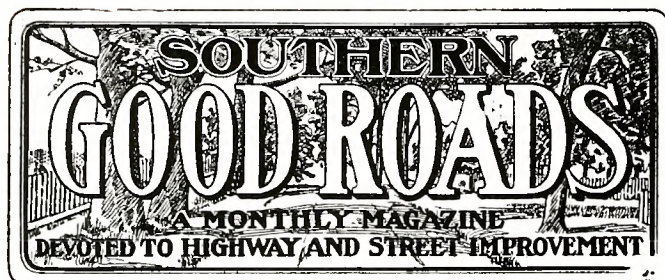
#### A Tribute to "Old Hickory."

Bancroft says of Jackson, "Himself the witness of the ruthlessness of savage life, he planned the removal of the Indian tribes beyond the limits of the organized states; and it is the result of his determined policy that the region east of the Mississippi has been

blazing trees, shelter their log cabin with the boughs and turf, and teach the virgin soil to yield itself to the plowshare. Theirs shall be the soil, theirs the beautiful farms which they teach to be productive. His heart was ever with the pioneer, his policy ever favored the diffusion of independent freeholds throughout the laboring classes of our land."

To connect with this grand trunk line Buffalo on Lake Erie, where Commodore Perry in September 1813 won a glorious naval battle, will come down through Columbus, Ohio, over the Old Trail Roads to Maysville, Ky., through Lexington and join the Jackson Highway at Mammoth Cave. From Montgomery, Ala., the Florida Branch will go through Andalusia to Pensacola, across the state of Florida through Tallahassee to Jacksonville, the gateway to Florida, the Mecca of northern tourists.

It is a grand, a glorious roadway, through the grandest and most fertile section of land in the world and in proportion to its number of miles there is more of its roadway that can be traveled the year round by motor travel than any other highway that has been proposed, planned or built in the United States.



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**Official Organ Southern Appalachian Good Roads Association**

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**Official Organ of the South Carolina Good Roads Association**

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FINGAL C. BLACK, Secretary, Columbia, S. C.

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APRIL, 1916.

No. 4.

The building of good roads in the Appalachian region and over the Southern states has probably gone a long way toward bringing to our fair section the establishment of the greatest musical organization of the western hemisphere. We refer to the formation of the National Festival Chorus and the building of the \$245,000 auditorium at Black Mountain for the great concerts to be given under the direction of Dr. Walter Damrosch. This is intended to be the initial step in the emancipation of America from total dependence on the Old World for the finer arts. The South has much beautiful legend, folk lore, romanticism and a glorious history and traditions from which to glean the heart of the great music to be composed in the future.

The establishment of this musical center should mean much for Southern good roads, as well as being dependent largely upon good roads for a large part of its patronage. The wonderful scenery and climate of the Blue Ridge has been the magnet that has heretofore drawn thousands by rail. Within the past few years road construction has made such progress that many motorists from a distance have been climbing the splendid winding grades that lead to the top of the eastern half of the continent. When the Central Highway of North Carolina is completed through the gap above Old Fort, which will be but a matter of months, it will furnish a fine roadway for tourists to come into Black Mountain. There are now already at least two fine

highways that lead to Asheville from the south and southeast, and another in course of construction. We may count it months only when the motorist may come through Swain county, whose road story is told in this issue. From South Carolina and Florida others may come by Spartanburg and Hendersonville. The wonderful road from Charlotte to Hendersonville and Asheville through Hickory Nut Gap is already completed. Other highways are being opened to the "Land of the Sky" from Tennessee and will furnish a doorway for the Middle West. Asheville and Black Mountain are cooperating in the construction of a magnificent boulevard for the sixteen miles between these two places, which will be one of the most important roadways in the entire South.

With all these things in her favor, may we not confidently predict that henceforth the great stream of motor travel will turn southward to find the land of sunshine and roses, of beautiful mountains and streams pure and sparkling, dancing their way musically down to the sea, the land of love and lore and the birth and abiding place of the art of the New World. It is the patriotic duty of the South to foster and nourish this western "Bayreuth," and much of this can be done through the construction and maintenance of good highways. The more we are visited the better the world likes us, and the more glorious will our future be.

### COUNTIES PULL TOGETHER

It is gratifying to observe the widening of the vision of our people in regard to the building of good road systems. Time was when the folks of a community who embarked on a road building project looked only within their narrow circle. Just a road for the folks who lived within the limits of taxation was all that was contemplated. Today, more and more the people are looking more and more beyond their own narrow confines and are getting a vision of the larger benefit that will come to their own communities through better intercourse with their neighbors. This is the spirit that is building great systems of roads, sectional, state and national in their scope. This is the kind of work that should be encouraged. It should be deliberate. Many of our roads that have grown into importance just happened to do so because in the course of time two counties forsooth touched each other with these great arteries of life. The result has been most gratifying. In other instances two or three counties bordering each other have gotten together and planned to let their intercourse be mutual. That is the right sort of a spirit. One little link of bad road will work great harm to two counties that would get much out of mutual intercourse. Who has not heard of spite fences? Have you ever taken notice to their parallel in road building? Sometimes for years a little gap of bad road, almost impassable, will stand between two great sections because of petty jealousy. When our

people grow larger in spirit neighboring counties will meet and talk over how they can best benefit all the people of both by building roads on a more comprehensive plan.

#### Arguments for Good Roads.

There is one motor car to every 19 families in the United States, and one motor to every mile of road.

This fact may not convert the habitual pedestrian to any large interest in the national good roads campaign. But put the betterment of highways up to any man as a military necessity and he will soon be backing up your arguments with figures of his own. France, he will probably tell you, was saved from the invader in September, 1914, by her great northern highways, which were perfectly fitted for the rapid transportation of her defending army; and Russia met disaster on her western frontier partly because there were no passable roads in that part of the empire.

The recent increasing interest in roads has many phases. Most minds are quickly impressed with the wonderful scheme for outlining the entire length of the United States boundary with a great national road, to be built and maintained by the government for purposes of defense.

This novel idea attracts both by its practical and its picturesque aspects.

At present the matter most important to the country at large is the Shackleford bill, which provides for the expenditure of large sums of federal money upon roads, and for the creation of a state highway commission.

The building of the Lincoln highway is also creating a tremendous amount of interest. This great span of 3,389 miles will connect the eastern and the western oceans, and will pass through 725 cities, towns and villages. In his annual report, Secretary Lane pointed out the greater accessibility to the beauty spots of the United States made possible through the development of good roads.

The enhancement of farm values and the cheapening of foods as the result of the easy access of the farmer to markets indicates the great importance of good roads as a factor of economics.

Not even the habitual pedestrian can escape a vital interest in the development of the highways of the country, when he considers them from every point of view.

#### 7,000 Feet of Good Roads Film.

The 7,000 feet of moving picture film which the Lincoln Highway Association has taken along the 3,400-mile transcontinental road last summer presents one of the most unique educational and humanely interesting reel features ever attempted.

Many things combine to make the film unusual. First, the fact that it is taken along the Lincoln Highway, the great road which has attracted the unanimous interest and support of the entire country, and shows the actual conditions along the route, conditions about which so much has been written and said during the past two years. People now have an opportunity to see with their own eyes the wonderful improvements which have been completed and which were in progress during the summer in many of the states. Governors and mayors greeted the film taking party; great crowds congregated in every locality while the pictures were taken; every city has put forth an effort

to present the best possible appearance in the pictures which the whole nation will see. Special "stunts" were inaugurated for the benefit of the film by automobile clubs, boards of commerce and civic organizations in every section.

Flashes along the roadside abound in human interest; homesteaders seeking new fields, plodding along in the prairie schooner of earlier days; the man who is walking from New York to San Francisco; the President of the Lincoln Highway association caught cooking flapjacks in the Nevada dessert; the armored military cars driving the route to the coast on a test for the government. Why, ten times the length of the film could have been taken along the Lincoln Highway this year and every foot of it be throbbing with the very life of the people; a film which shows to millions America as she is.

#### War, Motor Cars and Good Roads.

Good roads form the basis of whatever plans for preparedness are followed out by this country, according to Col. R. P. Davidson, superintendent of the Northwestern Military and Naval Academy of Lake Geneva, Wis., and inventor of the first and only armored motor car ever put to practical tests in this country.

"It was in 1897 when I first decided that automobiles would be useful in warfare, and the newspapers all over the country laughed themselves sick over the idea. I have cartoons now showing how absurd my opinions were. I then mounted a rapid fire gun on an old three-wheeled Duryea car, one of the first built.

"The newspapers had another laugh in 1910, when I made up two cars mounting balloon-destroying guns. The idea of having guns that would shoot a balloon was considered another absurd dream. However, I proved the practicability of these guns with paper balloons, and took the two cars on the Glidden tour through Texas. Out of 36 cars starting that tour from Chicago only nine returned with the original engines, and my two balloon destroyers were among the nine.

These same cars made the trip over the Lincoln Highway last summer from my school to San Francisco. I took eight cars, all of them designed for military use, and made in the manual training department of the school by the students.

"The cars included a reconnaissance car, containing dictaphones, periscopes, road maps and other instruments for observing and charting the roads. There were the two balloon cars, a field hospital car, a field kitchen car, the armored car, a radio car and a quartermaster's car. We only took off chains for one day between Chicago and Denver, but the car reached San Francisco in good shape, and proved interesting to the officers at the various army posts.

"The cars returned in good shape, and the armored car was taken to the Plattsburg maneuvers in New York. General Leonard Wood thanked me for bringing the car, because he said it was the first armored car he had ever seen, and he has been Chief of Staff of the United States Army.

"These cars will be sent around to the army posts this summer. I believe preparedness is coming and coming shortly. We of the military schools expect to supply the reserve officers. President Wilson told me in December that the standard military schools had to be the dependence of the army for an extraordinary demand for officers."

Colorado county, Texas, plans to issue \$200,000 in good roads bonds.

## Our Old Stone Roads

**M**AKING the country over, millions of dollars have been invested in our Old turnpike and macadam roads. But the farmer, whose road taxes represent a large share if not the total cost of many of these roads, is now told that they are obsolete. That may be, these taking a road just as it stands, but the material of which it is composed is not obsolete.

These roads are built of crushed stone, exactly the material used today in the construction of the most modern types of permanent roads. Neither is the solid foundation, which has been compacted by years of travel, obsolete.

The truth is that these old roads possess two of the most important factors essential to the successful construction of every modern type of road—established foundations and good stone. All this costly work has

roads already established instead of tearing them up and building entirely new roads at high cost?

### Repair, Don't Waste Them.

Why not shape up, instead of digging up, these solid old macadam roads, giving them a covering of two or three inches of stone just as would be done in the case of ordinary repairs to macadam, but instead of using fine screenings or rock-dust for a filler, use a material that will hold the stone in place?

This has already been done in the case of a number of important and extensively traveled stone roads by using natural asphalt as a binder. The most important economies resulted, especially through the practical elimination of outlay for maintenance. This was conspicuously the case in the resurfacing of a Maryland stone road subjected to constant traffic of all types.



Save the Old Stone Roads with Asphalt

been done. The stone has been quarried, broken and hauled onto the road.

It is preposterous to say that these valuable roads must be torn up and thrown away because they have failed under motor traffic. They do fail, but not because they were bad roads of their kind or because of any defect in the quality of the wearing material.

They lack just one essential, and that is an indestructible binding material such as natural asphalt. And it is merely the application of this simple principle of binding stone together that has given us several types of new and costly roads designated by a dozen different names. These are practically the old macadam or stone roads over again, plus a stronger and more tenacious binding material. Methods of construction may differ as to details, but after the road is finished it is the same old stone road with a new binding material substituted for the unstable rock-dust and water that held stone roads together under horse traffic, but which is sucked out and dispersed under motor traffic. The foregoing applies to practically every type of new road. Then why not utilize the binding principle for stone

It was treated with the natural asphalt binder in 1910 and up to date maintenance has been a practically negligible factor.

The process does not require costly mechanical equipment, and the prolonged obstruction to traffic such as attends the construction of an entirely new road is avoided. After the natural asphalt has been poured and has penetrated to every void and recess in the stone, the road is rolled and at once opened to traffic. These roads are durable, free from mud and dust, and meet all traffic requirements.

Where roads are treated in this way the investment over and above the cost of usual procedure is merely the cost of the binder. Here is the proposition from the investment standpoint—the economic side:

Where stone roads subject to motor traffic are kept in repair, maintenance runs anywhere from \$400 to \$1000 per mile per year. The Maryland Highway Department says that State has been paying, on the average, \$450 per mile per year. This sum represents 5 per cent on \$9000. It means that over and above the construction cost of the road this annual tax for main-

tenance represents an investment of \$9000 per mile.

For a fraction of the sum an asphalt binder can be provided which, if it is of good quality and properly applied, will last for years. Here is a way to capitalize our huge investment in old stone roads. Use them for foundations for new asphalt-bound tops, instead of throwing them away and making a new investment in costly roads, new from the ground up.

#### Plan For Lexington Meeting.

C. C. Crabb, of Eminence, Kentucky member of the Executive Committee of the Southern Appalachian Good Roads Association met officials of the Board of Commerce of Lexington, Ky., in conference February 10, relative to the annual convention of the Association which will be held in that city next October.

The exact date of the gathering has not been fixed, but a meeting of the committee will be held in May, probably in Lexington, when a program will be prepared and the date fixed. Mr. Crabb said that the com-

thru the country in automobiles. Washington will be represented by Government officials.

On the official program, which will be issued after the meeting of the executive committee in May, will appear photographs of the splendid turnpike system in Fayette county, which is pronounced the finest in America.

#### Trains to Boost Roads.

Everywhere the movement for better roads shows increased impetus. The importance of highways that will stand up, as shown by the war in Europe, is recognized as one of the contributing causes to the growing popular interest in highway improvement.

A number of the states are planning to send out good roads trains this winter, to reach the farmer at a time when he is not busy with his crops. Those actively at the head of the good roads movement realize that the farmers, in large majority, must be drawn into the campaign for the funds required to construct permanent highways. A great missionary in this direction is the



How an Old Stone Road May be Rebuilt with Asphalt

ing convention will be the biggest thing of its sort Kentucky has ever had, and in importance is second to only the annual sessions of the National Good Roads Association.

The Southern Appalachian Good Roads Association comprises the States of Maryland, Virginia, West Virginia, North Carolina, South Carolina, Tennessee, Kentucky, Georgia and Alabama, and the Governor of each is expected to head the delegation from his state to Lexington. There will be according to Mr. Crabb, from a thousand to twelve hundred delegates to the Lexington meeting.

Mr. Crabb is a State Road Inspector and it is due to him that Lexington gets the Appalachian convention. He was in Bluefield, W. Va., last October when the association held its meeting there. He sent telegrams to Mayor Cassidy of Lexington, asking that the association be invited here for the 1916 convention. A strong telegram was promptly sent and the convention voted for Lexington. Mr. Crabb has for years been one of the most enthusiastic good roads workers in the State, and is now stationed at Paintsville.

Mr. Crabb said Maryland will send its delegation

automobile. A marked feature of the sale of automobiles for the last fiscal year was the number of cars that went into the hands of farmers; 50 per cent. of the machines disposed of last year were bought by farmers. It is odd but true that the farmer when seated in his new automobile sees the need of better roads much more readily than when on the front seat of a four-horse wagon hauling a load to town.

Railroads are cooperating with the States' Highway Department in sending out good roads trains. One of the states that will operate a train of this kind is Tennessee. It will make the trip in January. Representatives of the federal as well as the State Department will be on board. Miniature models of various kinds of roads will be exhibited. At all points of community importance along the route lectures, illustrated by moving pictures and lantern slides, will be given.

The superintendent of education of Calhoun county, Iowa, offers a free trip to the state fair to the school-boy in his county who writes the best essay of 500 words on how good roads will benefit the farmers of the state.

# Women Help Dixie Highway

By **NELLIE FROST FYFFE**

In Chicago Tribune

**I**T WAS Dixie that inspired countless numbers of southern women to toil uncomplainingly over mysterious white garments, with the weird "K. K. K." insignia embroidered in red on the shield, during the sorrowful days of reconstruction.

Stop at most any southern farmhouse nowadays, for in the big cities such talk is never heard any more, and the old man smoking his pipe by the open fire will tell you that something like 400,000 of those white suits, so terrifying when encountered astride a horse on the road of a dark night, were made by the southern women and never a word breathed of who was to wear them. The old man still remembers of stealing into the parlor, where the shades were drawn, shutting out the bright sunlight and the peaceful droning of the bees, to surprise his mother in the shadow of the horse hair sofa, sewing on something big and white and baggy looking, which was hastily tucked out of sight when he entered the room.

## Southern Women Make Sacrifices.

In those days the southern women made all sorts of brave sacrifices for the protection of their beloved Dixie, and possibly there is a measure of truth in the assertion that if the southern women could have been won over the south would not have been able to withstand the misfortunes of war as long as it did.

It is Dixie that is calling again to her daughters, and they are answering with the loyalty and energy characteristic of their mothers and grandmothers, not for the protection of Dixie this time, but for the upbuilding and broadening of Dixie.

The task they have set themselves to perform will wipe out sectional lines by the promotion of good friendship between all parts of the nation, it will relieve in great measure the lot of the lonely women dwellers on the farm, who have been cut off from the rest of their kind by being forced through circumstances to live in isolated districts, and will be of the utmost importance to the commercial future of the south.

## Women Aid Dixie Highway.

Having all this in mind, a coterie of prominent southern women have lately banded together to create active organizations for aiding in the work of building the Dixie highway. They have no intention whatever of doing this work single handed or making it a southern movement, but will enlist the aid of the women to the north in order that the Dixie highway may be a road in which all shall share alike.

The plan as originated by the women of Georgia is to plant trees and flowers along the highway, encourage folks who live along the route to paint their houses, barns, and fences, trim up the lawns, and mark all points of historic interest.

Wayside wells will be attractively marked, the ground around them cleaned up, a rustic seat built nearby, and an invitation to stop for a drink displayed at just the right spot where it will be sure to catch the eye of the thirsty traveler.

## Trees to Border Road.

A score of counties along the southern route of the highway in Kentucky, Georgia, and Florida already

have been organized and selections made of the trees and shrubs that will border the road. Through the beautiful Bluegrass region of Kentucky, famed in song and story, elm trees and dogwood will be planted; in Tennessee, on the stretches of road where rugged oaks and mountain laurel have not already been liberally distributed by the hand of nature, pecan trees will be set out.

The hackberry tree has been chosen to adorn long stretches of the beautiful roads in Georgia and several hundred of these have already been put in the ground under the personal supervision of the enthusiastic women who are behind the work there.

Royal palms, red and pink hibiscus, and oleanders in great profusion will add much to the semi-tropical beauties of the Florida landscape.

## Road Over 4,000 Miles Long.

The Dixie highway will be the first national roadway to benefit by the good roads educational campaign conducted by the various women's clubs throughout the country for some time. Taking into consideration the great length of this road, extending as it does from the Straits of Mackinac on the north to the Everglades of Florida on the south, a distance of over 4,000 miles, the work inaugurated by the women is no small undertaking.

The building of the Dixie highway, while a man size job, never could be a man's work entirely, for the beautifying of the highway is one of the most important features in the completion of a tourist route.

To the women of Bibb county, Georgia, of which the beautiful little city of Macon is the county seat, goes the honor of being the first to have the active co-operation of the high school pupils in the work of planting trees along the highway in Bibb county.

## Planters Donate Shrubs.

The planters of Georgia have been most generous in their cooperation and have donated quantities of trees, hackberry, mock orange and pecan for the purpose. The county commissioners in many sections have given official approval to the movements by furnishing convicts and teams to aid the women in the manual part of the work.

"Plant a tree for the baby instead of giving him a silver spoon," is the practical slogan originated by the Florida women in their campaign for better highways. The idea of planting a tree in the name of the youngest of the household came about through their desire to do away with barren, sun baked roads and to create instead broad highways bordered with flowers and shaded at just the exact spot in the road where the automobile might be expected to break down.

The farmers of a precinct near Marlin, Texas, have organized with the determined purpose of carrying a bond issue of \$400,000 for good roads in their community. The issue lost once before, but the farmers says the majority this time will be overwhelmingly in its favor.

Active work is in progress on Erath county, Texas, roads. \$120,000 is being expended.

## Road Dreams for Virginia

IN response to a copy of Senate bill No. 325, introduced in the Virginia Senate by Senator Rinehart, to provide for a system of highways for Virginia, Henry Roberts, of Bristol, vice-president of the Southern Appalachian Good Roads Association, and an authority on highway development, has proposed a plan which is much more comprehensive than the plan suggested by Senator Rinehart, and which should be of vital interest to every patriotic Virginian.

Mr. Roberts has for a number of years been active in promoting road construction in Southwest Virginia and over the entire southern Appalachian territory, and because of his foresight and the adaptability of his ideas, he was the subject of a lengthy story in the "Country Gentleman" some months ago, in which he was given the title of "Henry Good Roads Roberts."

When asked for his views on what would be a comprehensive and equitable plan for a state system of highways for Virginia, Mr. Roberts said that his mind was made up to make an appeal to the present legislature to so amend Mr. Rinehart's bill as to make it more comprehensive and more thoroughly practical to Virginia and the nation. Inasmuch as Mr. Roberts' views not only embrace the good of Virginia, but look ahead to a proper promotion of the national defense in time of war, his views seem to commend themselves to wide attention.

He said: "The question of preparedness is foremost in the minds of Virginians and Americans today. Virginia occupies a strategic position for both peace and war. Virginia and Virginians have done more than any other state or people to prepare the nation for peace and war. Virginia gave several states to the nation, and Jefferson acquired the great Mississippi valley and the West for the nation. Virginia has been the battle ground of two foreign and one civil wars, and will be the battle ground of any future wars in which this country may be forced to engage.

"The question of highways is inseparably linked with the question of preparedness in both peace and war. The farmers of the whole state are demanding and building improved highways. Virginians realize that highways are the arteries through which flow the life and business of the state, and where the highways are unimproved the life and business is at a low ebb.

"Virginia has climate, scenery, and history which may be sold to tourists every year for millions of dollars, if she will only provide the highways over which these tourists may travel. The entire motor tourist travel between the northeast and southeast now passes through Virginia, and by completing the 'Boone Way' from Cumberland Gap to Bristol, a large part of the motor tourist travel between the Middle West and Northwest and the Southeast may be routed through Cumberland Gap and Virginia.

"Therefore, why not plan a system of State highways and state-county highways which will result in a complete system of roads for the state and counties and become a part of a great national highway system?

"I suggest that the following be designated as State highways and named as indicated:

"First, 'Washington Way,' from a point on the Potomac River near Washington, via Richmond, to the North Carolina line.

"Second, 'Jefferson Way,' from a point on the Potomac River near Washington via Charlottesville,

Lynchburg, Roanoke to the Tennessee line at Bristol.

"Third, 'Lee Way,' from a point on the Potomac River near Washington via Winchester, Lexington, Roanoke, to the North Carolina line south of Roanoke.

"Fourth, 'Stonewall Jackson Way,' from Old Point Comfort via Richmond, Charlottesville, Lexington, to the West Virginia line on White Sulphur Springs road.

"Fifth, 'Pocahontas Way,' from Norfolk to Lynchburg.

"Sixth, 'Eastern Shore Way,' from Cape Charles to the Maryland line.

"Seventh, 'Appalachian Way,' from the West Virginia line at Graham to the Tennessee line at Bristol.

"Eighth, 'Boone Way,' from Tennessee line at Bristol to the Kentucky line at Cumberland Gap.

"'Washington Way' would become a part of a national highway extending entirely around the United States, and crossing thirty-four states and the District of Columbia, and would be Virginia's link in the national-defense highway, to provide for which Mr. Stephens, of California, has introduced a bill (H. R. 3607) in Congress.

"'Jefferson Way' would be a part of a national highway extending across the country to the Pacific, and linking together some of the states which Jefferson acquired for the nation.

"'Lee Way' would be a part of a national highway extending from Washington, through the southern states, to Texas.

"'Stonewall Way' would be a part of a national highway to intersect the 'Boone Way' at Louisville.

"'Pocahontas Way' would be a part of the state plan for preparedness in peace and war, and would be a fitting memorial to the beautiful Indian princess who did so much for Virginia.

"'Eastern Shore Way' would be extended northward to an intersection with 'Washington Way.'

"'Appalachian Way' would be a section of the 'Appalachian Way,' extending from the Canadian border to New Orleans, now being promoted by the Southern Appalachian Good Roads Association.

"'Boone Way' would be a section of 'Boone Way,' now being constructed from Daniel Boone's old home in North Carolina, where it would intersect 'Washington Way,' to Boone's old home in Missouri, intersecting with 'Lincoln Way' near that point.

### How to Secure the Roads.

"The State Highway Commission should be directed by the bill to lay out in a general way a system of state-county highways and report the same in the form of a map to the next session of the legislature, this system to consist of roads connecting the various county seats or principal towns with one another and with the state highway system, including spurs from the state highways to large towns on railroads.

"The bill should not specify the various towns through which the ways shall go, but the final location should be left to the State Highway Commission or to a commission to be appointed by the State Highway Commission, or Governor. If the final route is left open, the commission selecting same may then dictate terms to the cities, towns and counties upon which they will locate the routes. In other words, require the nec-

essary funds to be pledged to construct the roads before selecting final routes.

"The bill should also provide a fund to assist in the construction of each way under the direction of the State Highway Commission, and the amount to be expended on any mile should not be limited. For instance, the 'Appalachian Way' of ninety-two miles will be macadamized the entire length by this fall, except about twenty miles, of which ten miles is through a rough district in which the assessed values are small, and the district cannot provide the funds to grade and macadamize same, the cost being around \$40,000, but if the state would contribute, say, \$20,000 we could easily raise the balance by subscription added to what the district could do.

"The bill should also provide that where any of these state highways pass through counties which have a state convict road force, such convict force shall be worked on the State highways until the construction of same is completed, and then on state county high-

ways. In fact, the bill should provide that all convicts shall be worked on these state highways after, say, January 1, 1917, and that all state aid money shall be applied on the state highways or state-county highways after January 1, 1917.

"The counties and districts of the state are inefficiently expending tens of thousands of dollars every year in building short sections of roads that begin nowhere and end nowhere and the state has been a party to this plan. Railways build their main lines first, and then construct their spurs and sidings, and they would all have gone bankrupt if they had adopted the plan heretofore followed in building public roads in Virginia. So it is high time to make a change, and yet a very slight change, with an appropriation of say, \$100,000 to be used on sections of roads, where sufficient local funds cannot be provided, will accomplish wonders for the whole state (including the southwest, which is overlooked in the bill), and Senator Rinehart's bill with these amendments will turn the trick."

## Federal Aid for Good Roads

By ERNEST F. AYRES

THAT the present congress will be called upon to appropriate funds for a national system of highways is certain. If the bill is pigeon holed in committee or is defeated in the legislative halls, succeeding congresses will have to face the question until it is finally settled right. Ernest, conscientious advocates of better highways will appeal to their representatives to pass the bill. Equally earnest and conscientious men will fight against federal aid with a zeal worthy of a nobler cause.

What are the arguments against national aid? There seems to be but one valid objection, namely, that the states will abandon all attempts to build their own roads and devote their energies to lobbying appropriations through Congress. The pork barrel system of securing funds for public buildings and River and Harbor work is used as an argument against extending the government activities to road construction. But there is a big difference. The government pays the entire cost of all River and Harbor work and of its public buildings. All that is asked for the highways is that the United States pay a percentage of the cost of improving interstate roads, no work being started until the state has provided its share of the funds. The objection would apply if congress were asked for money to pay the entire cost of a national highway in each state, but this form of bill would meet with opposition from nearly all the good roads men in the country. The River and Harbor system is too horrible an example to copy.

The same objection has been raised whenever any state has undertaken to give aid in road construction. The opponents of this system have feared that the counties and districts would sit down and fold their hands, waiting for a kind, fatherly legislature to come along and fix their roads for them. But when it was found that the counties must do their share before the state would offer any assistance, they "humped themselves," as the heathen say.

### Those Able Are Willing.

The argument that federal aid means increased taxes looks formidable until one tries to figure how the

roads are improved under any system. State aid provides that the richer communities pay a share of the cost of improving the road from Perkins Corners to Turners Mill. Federal aid would mean that the large financial centres of the nation should pay a portion of the cost of building highways in the weaker states. It can be readily demonstrated that every foot of improved road in any section of the country benefits the large banking centres of the country, and they should be allowed to help pay the bill. Allowed, not forced, for the bankers favor the measure. The opposition comes from those least able to pay.

The opponents of federal aid estimate that it will cost \$2,500,000,000 to improve 10% of the highways. The United States Office of Public Roads states that about 10% of the total mileage is now improved, so this two and a half billion would finish surfacing 20% of our roads. This would give a fairly complete system of good roads all over the country. The present loss on account of bad roads is conservatively estimated at one billion dollars a year. Using their own figures, this loss would pay for the entire improvement in two years and six months. That the loss is mostly indirect, while the funds used in improvement would have to be raised by direct taxes, has no bearing on the case. The money is gone in either event.

Of course the old cry of "Graft" will be raised, but is it not fair to assume that our national law makers are of the same average honesty as our state legislatures and county officials? No charge of graft has ever been raised against the U. S. Office of Public Roads, and are there no honest men to take the places of the present incumbents when they retire from public life? No charge of corruption has been raised against any State Aid Engineer or Commissioner, although the enemies of this system are continually on the lookout for irregularities. Experience has shown that there is usually far less graft under a centralized authority that where every Tom, Dick and Harry are given a small share of the money to spend as they see fit.

Poor old Paternalism. This is always the last charge

to be brought against any improvement in which the state or nation is asked to take a hand. No one cries paternalism when the new post office is built in his town. This shows a remarkable business judgment on the part of the United States. But it is paternalism of the worst sort when the other fellow wants a federal building. A corner in the grocery is plenty good enough for that dead and alive town. The government built highways in the early part of the nineteenth century, and no one called it paternalism. Then the railroads came, and the nation transferred its fostering care to the new infant industry. This infant has grown up and is abundantly able to support itself, but the other baby, the road, has been stunted in its growth. It needs a little more care from father.

The Office of Public Roads was established as an experiment. Its opponents feared graft, increased taxes, corruption, lobbying and all the rest of the ills on the calendar, but none of their lugubrious predictions came true. The office has done wonderful work in spite of penurious appropriations. May we not assume that when the scope of the work is increased, that it will be carried on as efficiently as in the past?

The automobile has abolished state boundaries. The highways of today are no longer simply the concern of those who live beside them. Good roads are a national issue and the nation should take some interest in them. Its representatives, the rural free delivery men, are interested, and they will never be able to do their work efficiently until Uncle Sam takes a hand in improving their routes. It is about time he tried it.

#### Pay for Road Advertising.

The farmers are losing hundreds, the counties thousands, the press millions of dollars because road advertiser pays nothing.

Compel the road advertisers to either use the press, pay the farmer rental for space on private land or pay into the county road fund a rental for the use of the road.

If the advertiser uses the press he will pay a legitimate price, if he uses the farmer's land he will put dollars into the farmers' pockets, if he uses the highway to dodge paying either, then let him pay part at least towards the upkeep of the road.

Both press and farmer should be interested in plan that increases the road revenue without increasing the farmer's tax.

A little more than forty-three miles of road out of a total of 203 remains to be worked out on the Louisville and Nashville division of the Dixie highway, that is in the ten counties in Kentucky between Louisville and Nashville. Ninety-five thousand dollars is available for the work, according to a report compiled from estimates in the offices of the county judges in this district by W. A. Brownfield, Elizabethtown, Ky.

One district, Lincoln, at Fairmont, West Virginia, contemplates the expenditure of \$450,000 in building good roads this year. A number of the communities of that state are building roads of the more permanent character.

At a recent good roads meeting held in the court house at Hopkinsville, Ky., both white and colored speakers were on the program, and all political creeds pledged to pull together.

A recent decision of the supreme court of Kentucky validates the issuance of several million dollars worth of bonds in the mountain counties of the Appalachians and means much to the building of the Boone Way and other roads in that section.

#### STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Southern Good Roads published monthly at Lexington, N. C. for April 1, 1916.

State of North Carolina,

County of Davidson, ss:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Fred O. Sink, who, having been duly sworn according to law, deposes and says that he is the Secretary-Treasurer of the Southern Good Roads.

Publisher—Southern Good Roads Publishing Co., Lexington, N. C.

Editor and Manager—H. B. Varner, Lexington, N. C.

Managing Editor—E. E. Witherspoon, Lexington, N. C.

Secretary-Treasurer—Fred O. Sink, Lexington, N. C.

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H. B. Varner, Lexington, N. C.

Fred O. Sink, Lexington, N. C.

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FRED O. SINK, Sec-Treas.

Sworn to and subscribed before me this 22nd day of March, 1916.

W. H. MENDENHALL, Notary Public.

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## GOOD ROADS NOTES IN BRIEF

Eight counties in western Kentucky have just let contracts for road work totaling \$95,000.

Pecos county, Texas, has begun a contract for grading 40 miles of public road and graveling 21 miles.

\$325,000 worth of bonds have been voted by Monroe county, Tenn., for the construction of about 80 miles of the best type of macadam roads.

Henderson county, Ky., voters decide the 20th of this month whether they will spend \$400,000 in the construction of a good system of county roads.

The citizens of St. Louis county, Mo., recently voted three million dollars worth of bonds by an almost unanimous vote for the construction of highways.

Citizens of Gowen and neighboring Oklahoma towns are building by popular subscription a link of road that connects the towns of McAlester and Wilburton.

Crittenden county, Kentucky, has called an election for May 27th to vote on an issue of \$200,000 bonds for good roads. Christian county has just recently voted an issue.

Baltimore, Md., has awarded another contract for paving of over \$100,000. This city is carrying out one of the most extensive plans for public improvement ever undertaken in the South.

Fifteen Tennessee counties east of Nashville have set aside for immediate expenditure in building good roads \$2,974,000. 1,500 miles of highway is contemplated from the expenditures.

Citizens of the state of Iowa will pay in taxes for road building and maintenance approximately eleven million dollars this year. And Iowa already has more good roads than most states.

Representatives of the State Highway Commission of North Carolina and the United States Office of Public Roads will tour North Carolina during April, starting from Morehead City the 12th and ending at Marshall the 24th.

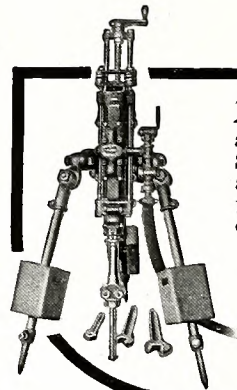
The Louisville, Ky., Auto Club is taking active steps to have the National Midland Trail from Washington to San Francisco located through that city. Louisville is now on the route of the Dixie Highway, Boone Way and Jackson Highway.

The good roads spirit was rampant in Jacksonville last month, when the Florida automobile show was held. Representatives from all over the state and many auto makers and distributors from other states were there. Florida holds a large interest for the auto maker and owner.

A two days' session of good roads enthusiasts from Texas, Arkansas, Oklahoma and Louisiana was held at Texarkana last month, at which plans were formulated for large development in those states looking to the routing of the Jefferson Highway on the west side of the Mississippi.

The proposed Jefferson Davis memorial road would stretch across the southern border of the continent from Tampa, Fla., to Los Angeles, Cal., a distance of 3,780 miles. Maps of the route agitated have been distributed. The National Highway Association endorses the road.

Gaston county, N. C., commissioners have asked for bids on Tarvia or other suitable surfacing for wornout macadam road from Gastonia to St. Mary's College. This is a stretch of over a dozen miles of road on the National Highway. \$50,000 was recently set aside in that county for repairing roads already built.



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Every dollar you cut the cost of road grading is a dollar added to your net profit. We can put you in touch with one man who says he cut the cost of road grading in Louisiana from \$26 per mile with mule power to \$4.50 per mile with Mogul kerosene tractor power. His figures are in the official records of his parish.

That is probably an extreme case, but the fact that so large a saving as this could be made, is interesting. It suggests that possibly your costs are higher than they need be. Perhaps a little investigation would pay. Would you like to see some of the figures we have collected—some of the savings we have helped other contractors and road builders to make by changing over to Mogul or Titan kerosene tractor power? They'll cost you nothing but a two cent stamp and a little time. Write for them.

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Chicago U S A

# SOUTHERN GOOD ROADS

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## Notable Record of Forsyth

### Live Road Commission Benefits North Carolina County—First Concrete Road in State

MARCH marked the end of the fiscal year of the Forsyth Highway Commission which was a remarkable year in many respects. Not only have they accomplished virtually all that they contemplated at the beginning of the year, which was also the beginning of the administration with Mr. James A. Gray, Jr., as chairman, but much other work has been done of the real constructive nature, and policies have been observed by the commission thru a business-like administration that has guaranteed to the people of the county the strictest economy, and full value for the money expended.

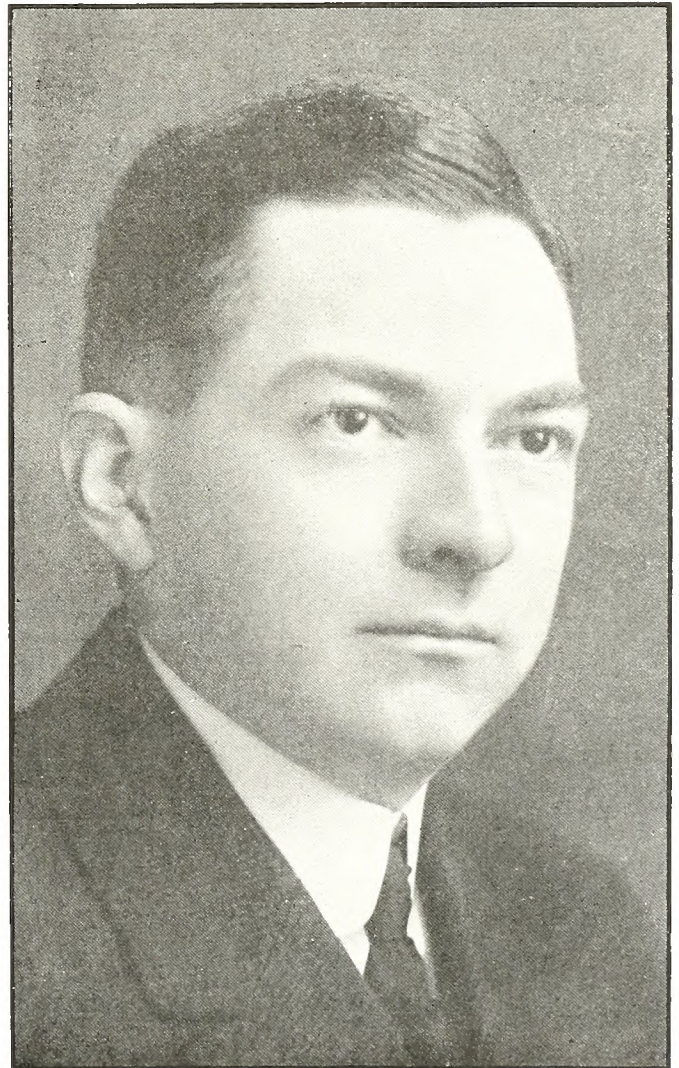
The year has been remarkable also in the fact that more miles of roads have been constructed this year than any year heretofore; and further for the reason that the construction this year has included roads that are of value to the entire county, which have for years been regarded as of the utmost importance. Every corner of the county has received a share of new highways, suggesting that the vision of the commission has been one for the complete development of the entire county's interests.

#### A Comprehensive Policy.

When the present administration took hold of the work for the county they announced that all the work then under orders of the former administration would be completed, and its policy for the future was announced.

In this policy was the decision of the commission to devote more attention to promoting a comprehensive plan for building roads which will develop for the county a complete system of highways leading in every direction, connecting with adjoining counties as rapidly as possible. Other forward moves, which have been carried out, were the definite decision to undertake the repair of the macadam roads in the county, the repainting at stated intervals of all steel bridges (most of them not having been painted in years); inaugurating a system of contracting to individuals the work of dragging the soil roads, very much like the system of section masters on the railways; and also starting an organization of Boys' Patrol to aid in dragging some of the roads.

The commission has found during the year that it was economy to add to the equipment a Ford machine for the superintendent of the road forces, that he may



JAMES A. GRAY, JR.  
Chairman Highway Commission,  
Forsyth County, N. C.

be able to make a personal inspection of the convict camps and the roads each day, which would be impossible without a machine.

A motor truck was also added to the equipment for

use in repair work and conveying material wherever needed in the county, and it was found that in a very short space of time it had proven a good investment for the county.

#### Co-operation Has Marked Progress.

The splendid co-operation of the semi-public corporations as well as the people has also been prominent in the conduct of the work of the commission in the county this year. Thru the efforts of the chairman the commission secured a donation from the Norfolk & Western Railway Company of \$1,350 toward the construction of one road in which four grade crossings were eliminated between this city and Walnut Cove.

Another evidence is presented in the agreement by the Southern Railway Company to remove the present bridge near the Children's Home and erect an up-to-date 60-foot bridge, resting on concrete piers; and also the agreement of the Southern Public Utilities Company to make the pavement between the tracks on the Southside Hill, leading out Main street, conform to the character of construction concrete being used in paving that section of the street.

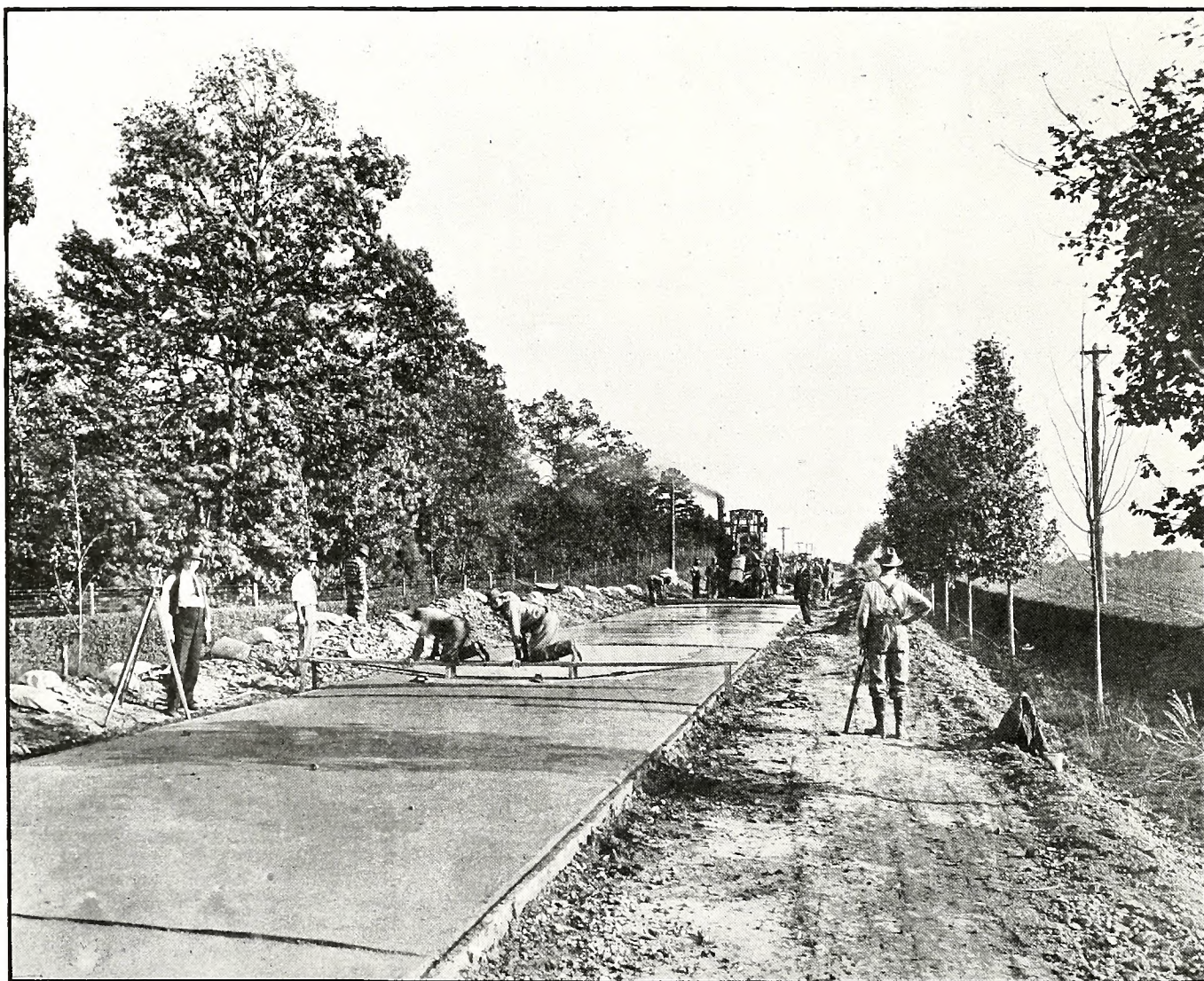
Chairman James A. Gray, Jr., and the other members of the commission have kept in close touch with the progress of the work, and for this reason they have made for the county the splendid record in road build-

ing. The commission is composed of Messrs. Gray, D. W. Harmon, (who also acts as engineer for the commission), and E. T. Leham. Mr. W. A. Mickle is secretary to the commission, and thru a system of reports compiled by the secretary and the engineer a perfect accounting of the cost of all work is kept. The members of the commission are perfectly familiar with the details of the work and have spent much time in maturing plans at the least cost to the people of the county.

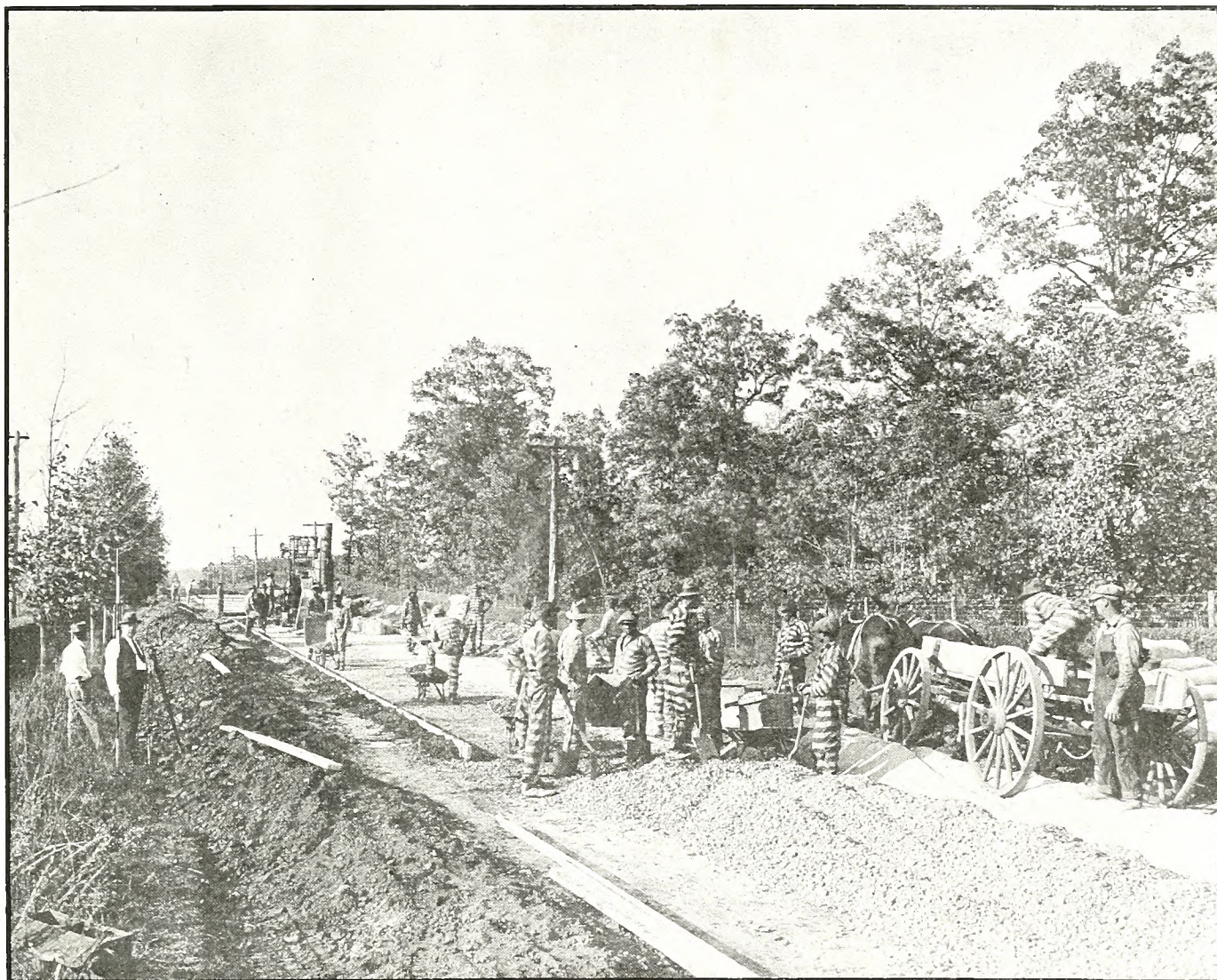
#### Some of The Work Done.

In reviewing the work done during the year the completion of the work under way a year ago must be considered. The tarvia road thru Waughtown was then under way, and was completed in the early regime of the present administration with the construction of about one mile. The road on the Centerville Hill was also rebuilt and the approaches on both sides of Salem creek were widened and Belgian blocks were laid on the north side of the bridge.

The work on the Tobaccoville road was begun at that time, leading from Bethania to the Stokes county line, but about four miles of this road has been constructed this year. This road has not been known or used as much as it should be by the people of the city, but leading as it does into a territory where there had been no



Constructing Concrete Highway, Bethania Road, Forsyth County, N. C.



Convicts Building Concrete Road, Forsyth County, N. C.

road improvement, it has now become one of the most important of soil roads, and is of a fine type of construction.

The important link of two miles on the road leading to High Point, making a fine connection between the two cities, is a piece of road that has been badly needed.

Four miles of soil road toward Pine Hall, opening a direct route to Madison and Roanoke, was constructed to the county line. This is considered the most scenic stretch of highway in the county. It leads from the old chair factory site at Walkertown to Pine Hall.

The construction of the Germantown road from the Rural Hall road to the Stokes county line is another piece of road that has long been dreamed of, and is now accomplished. With the building of this stretch of four and a half miles a direct route is established into the very heart of Stokes county and is essential to the development of Forsyth as well as an aid to our neighbor county of Stokes.

The Red Bank road penetrating the Box Mountain section for a distance of two and one-half miles gives a fine soil road to a section of the county that has heretofore not been reached by improved roads.

In the southern part of the county and leading from the Salisbury road, a two mile stretch toward Lexington, known as the Mock road, is another important

link constructed that penetrates a section also not heretofore reached.

Between Dennis and Fulp on the road to Walnut Cove, two miles of road have been completed during the past year, the building of which had long been delayed.

The commission has also completed the Tri-County Post Road via Clemmons, leading to the Forsyth-Davie bridge, with the co-operation of the federal government. This included the reconstruction of about two miles near Hanes station and the construction of tarvia type of road from Peters creek, west of the city, to the top of the Hanes Hill.

The road from Brookstown to the Forsyth-Yadkin bridge, a distance of about four miles, is graded practically the entire distance, and this road has also been partly soiled. It will be completed at once and will open up a route connecting with Yadkin roads just being constructed, to a section which has heretofore had no improved road reaching Forsyth or Winston-Salem.

In Belews Creek township an important road has been started, one mile of which has been so far constructed. This is the first improvement in Belews Creek township, except a short stretch across one corner which has been of comparatively little service to the people of that section. This new road leads into

one of the best sections of Forsyth, which has in the past been more closely allied with Guilford county and Greensboro because of the inaccessibility of the remaining section of Forsyth.

#### **Builds First Concrete Road.**

Probably the most outstanding feature of the administration is the adoption of the concrete type of road for permanent construction. The Forsyth Highway Commission was the first in the State to adopt this type of road and start construction. It is being recognized today as the only permanent type of road building. The concrete road first built in Forsyth is located on the Bethania road, and including the bituminous macadam also constructed on this road, represents about three miles.

Several short soil sections have been constructed including Sunnyside avenue, about half mile in length, the road from Peters Creek to Ardmore, and the road leading into Old Town, in all about two miles.

In addition work has been started on the concrete road on the Salem hill, and the road leading from Broad street terminus to the Salisbury road. This last link will open up a section of the county that has heretofore been shut off from any direct communication with the city, being compelled to take a circuitous route to reach the city at all. This is conceded to be the

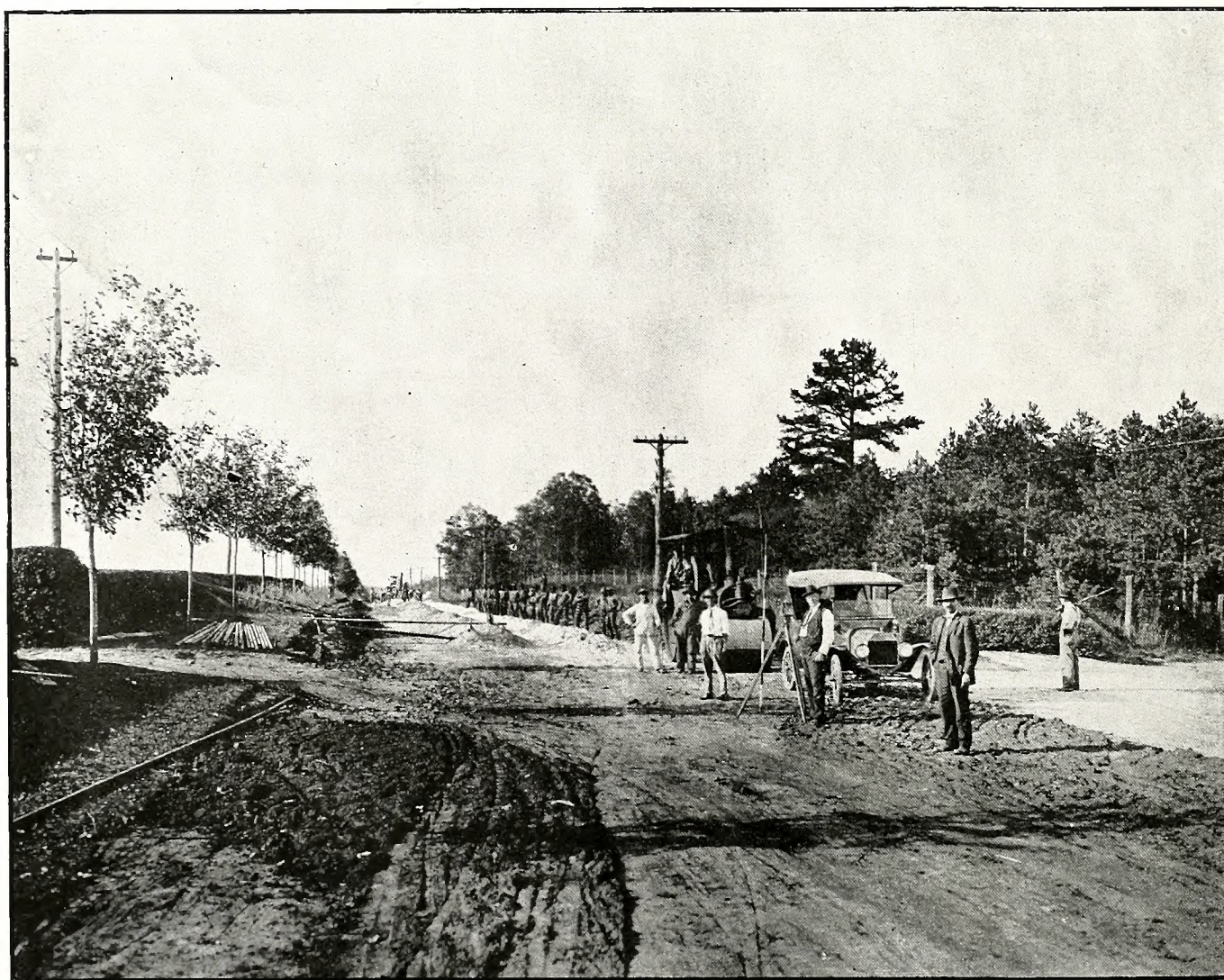
most constructive piece of road ever proposed in the county, and will prove a great benefit to the people.

#### **Accomplishments Reviewed.**

In summing up the accomplishments of the highway commission it is found that it has actually constructed during the year an aggregate of 27 miles of soil road, all practically completed; six miles of bituminous macadam and concrete, and rebuilt several stretches. Approximately thirty-five miles of improved roads have been built in the county during the past year, against 21 miles in 1914 and 18 in 1913.

It is understood that the policy of the commission for the new year will be to guard the highways of the county closely, looking after the upkeep and repair of the present roads, including the systematic dragging of soil roads and the use of additional binders on the bituminous ones as well as to continue constructing such new roads as funds will permit, realizing that of necessity they must be conservative although there are many roads desired by citizens, all of which, of course, cannot be constructed at once.

Tuscaloosa county, Ala., spent a hundred thousand dollars on its good roads during the past year up to the first of April. Among the work done was the building of 16 miles of asphalt surface roads.



Grading for Concrete Highway, Bethania Road, Forsyth County, N. C.



Bethania Concrete Road As It Looks Today, Forsyth County, N. C.

#### Convict Labor on West Virginia Roads.

Philip J. Walsh, general superintendent, of road construction in Kanawha county, West Virginia, says that he would rather work a crew of prisoners from the penitentiary than any gang of free labor that he ever saw because he can obtain better results. Here's Mr. Walsh's plan of handling the convicts to get the desired results.

During 1914-15, Mr. Walsh was in charge of a camp of twenty-five prisoners furnished by the state to Kanawha county at 75 cents per day of nine hours. The state clothed, housed, fed and guarded the prisoners, who were worked entirely under the honor system and treated like paid laborers, the guards being unarmed.

The prisoner wore the regulation uniform of the penitentiary, which looks like a mail carrier's uniform for "dress-up." Khaki trousers, a blue shirt and a straw hat were used to work in while the weather was warm. In winter, the men wore their gray uniform under a suit of overalls, with heavy woolen stockings, gum shoes, ear caps and leather mittens. With this outfit only two days were lost during the entire winter on account of weather conditions.

Tents were used, but Mr. Walsh suggests portable houses as more satisfactory. The food was bountiful, with plenty of vegetables, as it was realized that to get a good day's work out of a man, you must feed him well. Only two guards were used, and although the men worked over four miles of road, no man ever deserted the gang while working.

Negroes responded to the honor system even more rapidly than the whites. This will make possible the

development of convict road work in all the southern states. If engineers can be found able to do their part.

The "boys," as they were called, arrived at the camp on one of the hottest days of the summer, and at first could only work half a day, but gradually the time was increased to nine hours. They took a personal interest in the work and soon found the job for which they were best fitted. One young Italian did such splendid work as a stone mason that the Governor pardoned him fourteen months before his sentence expired.

"This is the way to build your highways," concluded Mr. Walsh: "It gives the poor unfortunates a let-up in life; it's a man to a man's job; but most of all it gives you a dollar's worth of road for every dollar spent, at a cost of 75 cents per day per prisoner."

#### Pave and Light County Roads.

The thing that Los Angeles has done in making beautiful boulevards out of country roads will be done eventually by every state, says W. B. Howell of New York City, United States customs judge, in Kansas City recently.

"I have recently gone over their roads," the judge said. "They not only have paved these country roads and lighted them with electric lights, but have planted flowers along the sides."

"These roads do not place a heavy burden of cost on anyone. They are paid for by bond issues with a long time to pay out, and they have proved a profitable investment, for they bring thousands of motorists, who spend enough money there to make prosperity."

# Good Roads and Nature

## Modern Highway Construction Brings Beauties of Scenic America Within Reach of the People

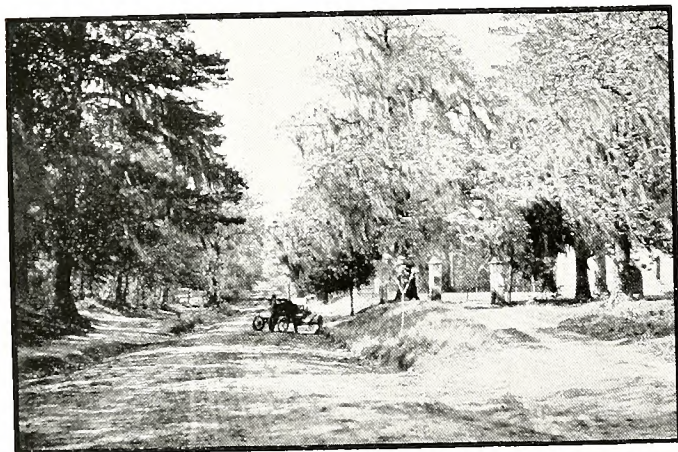
THESE are a good many "Yankee notions" that are really worth while, and the most of them are of a very practical sort. For example, something over twenty-five years ago the United States Minister to Switzerland was a New Englander who was an enthusiastic believer in the out-of-door life. He thought that every man ought to go out into the fields and lanes and wash his lungs with pure air and lift up his soul with views of the open country with its marvelous variety of growing things and the vastness of its stretches of hills and valleys and forests and streams, all held under the unmeasurable bowl of the heavens as if it were in the hollow of the Almighty's hand. He had been a friend of Thoreau and practiced what he preached. The opportunity for out-of-door recreation was so great in Switzerland that he asked a fellow-townsmen, a young engineer student in that country, to make a walking tour of Switzerland and write his experiences for a number of New England newspapers. For three months the young man footed it over the roads from Appenzell down by the Lakes of Zurich and

there would have been neither health nor enjoyment in the long tramp through mountain passes and sheltering forests and by the side of beautiful lakes hidden in the heart of Alpine fastnesses to hospitable inns at the close of day. As Samuel Johnson wrote: "There is nothing which has yet been contrived by man by which so much happiness is produced as by a good tavern or inn;" and it was in the inns of Switzerland that the pedestrian found his sweetest solace after his days in the open twenty-five years ago even as today they stand with open doors to welcome the passing stranger to hospitable fare. They were run then, as they are run now, to heighten the delights of tourists on the tramp or when journeying by other means. They were not only built to take care of creature comforts but they were all, even the humblest of their kind, bureaus of intelligence for the information of their guests as to the best way of seeing the country with the least expenditure of effort.

### See America First.

This little tour into the heart of the world was made quarter of a century ago and many thousands of other Americans have followed the same itinerary in all the years that have followed; and some of them at least have brought back to their "dear America" suggestions of how the unequalled beauty and resources of their own land might also be made an open book for the entertainment and profit of a teeming population that would like to live out of doors. It is only within the last few years, however, that any effort has been made to develop the scenic glories of the United States, and the more the subject has been studied the greater the enthusiasm with which it has been received. During the present year committees and promoters of one sort and another have been flocking to Washington with stories of the wonderful lands of promise lying within a few days' journey of all parts of our great domain mountains of majestic height, forces of illimitable reach, waterfalls of exquisite beauty, canyons of almost unfathomable depths, fields of everlasting snow, slow-moving geysers, miles of flowers and herds of well-nigh forgotten creatures of the wild, all inviting the world, weary of the artificial ways of men, to the open spaces where Nature revels in her wildest moods. At the White House, for the entertainment of the President; in the theatres, to the great delight of packed audiences; in the clubs, for the enlightenment of the scientists who do not know how it was all done because there is nothing in their theories by which it can be measured, and to the newspaper folk with the hope that they might be able to intermit "Mutt and Jeff" for one day at least for the people who take an intelligent interest in substantial things, and before committees of Congress that they might appreciate the importance of opening the wildest to the observation, if not the occupation, of men, these missionaries have been proving their speech by their pictures of what the eye could see if only good roads were opened to the wonder lands beyond the further hills of the impatient East.

Secretary Lane, of the Department of the Interior, un-



Beauty Spot on Statesburg Road, Near Sumter, S. C.

Lucerne over into the St. Moritz valley, to Como and Lugano, back again to Lake Lucerne and then to Chamouix, through the valley of the Rhone, over to Grindelwald and Thun to Berne. Everywhere a comfortable inn, or tavern, made the evenings as pleasant as the days were delightful; everywhere men of distinction were encountered tramping along leisurely and enjoying a kind of life that was a revelation to the young American. At times his walking companions were famous German professors, for several days a high officer of the Union Pacific Railroad journeyed over the same paths with him, two of the leading physicians of Boston kept company with him at another time, and men well known in English professional and manufacturing life were with him on many stages of the tour.

All this would not have been possible without good roads. The American would not have had any companions on the road otherwise. He would have found it impossible to "look up unto the heavens" or to view the entrancing landscapes had he found it necessary to pull his feet out of the mud at every weary step, and

der whose progressive management the wild regions of the United States has been placed, has been doing his part to make them available for the improvement of the people. It has taken twenty-five years for even a few progressive communities lying near by to appreciate the economic possibilities of highway tourists as distinguished from railroad tourists, and to make provision for them in the out-of-the-way places in the great parks and reservations of the National government. It has come to pass that in some of these great parks roads have been built over which almost any sort of traffic can be conducted and inns have been built for the entertainment of man and beast, so that in these places it is possible for stage or automobile or horse or footman to penetrate into the very heart of things in our Alps that lie beyond Italy. There is "money in it" for the forehanded who will do their part, but the building up of the wilderness is not possible without the building of good roads.

It is only necessary to look through the pages of an automobile guide to see how thoroughly many of the larger hotels of the country have recognized the importance of the tourists as an aid to business. And the day is coming in the districts which have good roads where the smaller inns, if they be provided with the things that travelers must have, will regain in a meas-

ure the popularity they enjoyed in the stage coach days, when gentlemen traveled in coach and four, and when mine host was friend as well as host to many men through many fruitful years. Already in some of the states where good roads have been built a number of years, the old inns have been rejuvenated by transient business, and the charm of travel over the highways, as compared with the dusty heat of stuffy cars, has been learned by the people who live an out-of-door life. Good roads and good hotels have an inter-relation that will bring prosperity to the latter as quickly as their managers realize to the full the extent and desirability of tourist travel.

#### Clay Blasting Booklet.

The E. I. du Pont de Nemours & Company of Wilmington, Delaware, have just had printed a Clay Blasting Booklet. As it is the first booklet ever issued on this subject it contains valuable and interesting information. Some of the phases covered are "Digging Clay," "Stripping," "Blasting Down Shale," "Digging Plastic Clays," "Mining Flint Clays," "Draining Clay Pits," as well as full information on the use of explosives.

The booklet will be sent to any address upon request.



Forsyth-Davie, Inter-County Bridge, North Carolina

# Battle Tactics and the Paved Highway

By P. S. BOND

Major Corps of Engineers U. S. Army

**T**HE USEFULNESS in war of a substantial system of highways can scarcely be overstated, but it can be misunderstood and frequently is. Our freedom from wars, during long periods, has made the term 'military road' little more than an historical phrase in America. It calls to mind the Cumberland pike and suggests the conditions of military enterprise that gave rise to our constitutional provision for federal military roads.

Those conditions antedate the railroad. In the present state of affairs the longer hauls for the assembling of soldiers, munitions and supplies will almost invariably be made by rail. Military considerations do not call for long single lines of road through the interior of the nation so much as for intensive systems of parallel and intersecting roads in the probable zones of actual warfare in case of attack by a foreign enemy.

To appreciate the tremendous usefulness of such road systems, it may be necessary to review some of the conditions of modern war as exemplified in Europe today. In speaking of innovations, I use the word with respect to popular American conceptions of war, which are still largely founded on the civil war of the sixties. The European war has really developed very few innovations, from the standpoint of the military student. Attacks by gas and liquid fire, effective as surprises, have been among these few. The general nature of the struggle was either anticipated by military men or actually demonstrated in the other wars of the last two decades. I wish particularly to refer to some phases of modern war with reference to the use of highways.

While less reliance than formerly is placed upon permanent fortifications, trench warfare between nearly equal forces tends to develop a condition of deadlock, in which the tactics are similar to those of a siege. Hence the routes of supply do not, under certain conditions, vary as much as in the old days of open fighting when one army would pursue another half across a continent on foot.

Not only are routes of distribution more nearly permanent, but the volume and weight of the trains is such as to justify and require the most substantial kind of highways. Larger armies eat more food. Larger and more intricate guns consume immensely more ammunition. The British army in Belgium is said to have fired more shells in a single day than were used in the entire Boer war. These are transported from the railroad terminals to the place of consumption very largely by motor truck and the effect on any but the most substantial roads can be imagined.

Add to these conditions the mobility now required for very heavy guns. It can be seen that the placing and replacing of ordinance weighing many tons per piece—the saving of guns in case of a sudden retreat—would be virtually impossible under the conditions that prevail on most American highways during long seasons, or would impose the heaviest possible tasks upon the engineering arm of the service.

We have pictures showing the kind of improvised roads upon which the resourceful Germans have been compelled to rely in Russia. They follow the princi-

ples of the old American corduroy road, with a foundation of stringers and transverse logs, on which are laid brush and dirt. The contrasting advantages of level durable road surfaces, prepared in time of peace with an eye to the exigencies of war, are so striking as to make comment unnecessary.

## Need Quick Concentration.

But the greatest advantage of motor trucks and suitable motor roads has yet to be mentioned. To appreciate it, one must bear in mind the broad nature of battle tactics. War is not unlike football. An army must hold the foe in check at all points on the line and relies for its success upon smashing attacks by the concentration of troops at some particular point. In the old days the plan of attack was often concealed from the enemy until the moment when it was sprung. Distance and natural obstacles to vision made it possible to work out a maneuver with comparative leisure. Today the hostile aeroplane hovers overhead and conveys prompt information of the concentration of any considerable body of troops at any given quarter.

To render such an attack effective, it is therefore necessary to make it a sudden attack, like the dash of the backfield in a football game. To be able to move a whole division by truck and auto to a critical point at a rate of twenty or thirty miles an hour would greatly facilitate both offense and defense. It is said that the battle of the Marne was won by the sudden concentration of French troops, using motor transport over the splendid chaussees of France, upon the German left wing.

One road will not suffice for this variety of tactics, although one is better than none. The ideal would be a number of parallel routes traversing the line of battle, with frequent cross roads to permit the distribution of reinforcements at any desired point or points. In war, football or chess there is only one rule for success and that is to oppose a lesser force with a greater force at the crucial point in the conflict. This does not mean that the largest army always wins, for the largest army may have three quarters of its numbers out of action through lack of generalship or failure of transport facilities. Mobility can take the place of numbers much better than numbers can be made to take the place of mobility. When this fact is digested, the immense tactical value of paving can be better appreciated.

The motor can thus lessen the fatigue of forced marches and increase their possible radius five fold or more. It is also probable that motors will take over part of the work of transport formerly accomplished by rail. There is considerable necessary delay in entraining troops and getting a clear track for their movement, so much so that the old rule was to undertake movements of thirty miles or less on foot, as being prompter than train service. With suitable roads and an abundance of motor vehicles, this line of demarcation might be placed at sixty or a hundred miles or more, depending on the particular circumstances of the case.

The unimproved highway is our weakest link today

from the standpoint of military transport. America has the railroads. It has the autos and auto trucks. Whether the latter can be used, or whether we must go back to the age of the mule whacker and the dreary march rests with those who are responsible for our highway improvements. Any city within a hundred miles of our coast or frontier may some day be the base of military operations that will put its surrounding highways to the severest test. Very few would meet it creditably. Cuyahoga county, surrounding Cleveland, would offer a better opportunity for modern maneuvers than any similar locality with which I am familiar. The brick road, properly constructed, stands high in the estimation of army men for such purposes as I have been describing.

In a military crisis such a system of roads would much more than pay for itself in the saving of other forms of military expenditure. Considering also how they conduce to the wealth of the nation in times of peace, there seems to be no possible argument against this phase of preparedness.

### Good Roads and the Women.

"Who has said a word about what good roads are going to do for women?" asks J. Olmstead, of O. J. Olmstead & Sons, distributor for the Haynes "Light Six."

"We have had dinner in our cars that good roads are going to profit the general public by cutting hauling costs, vivifying the country, booming real estate values, but no one has so much as intimated that good



Splendid Curve on Top Soil Road, Near Warrenton, N. C.

roads have benefits in store particularly for women. They might well feel that they have been slighted.

"Women and automobiles have been marked as boon companions. A few women drove cars when they were cranked by hand. But since the advent of the self-starter, and improved steering devices, the connections between milady and her automobile have been especially close, for women may now take their cars and go where they please, so long as streets and roads are good.

"There is no getting around the fact that the automobile has made a prettier, healthier, and more self-reliant woman. The woman driver today can thread through traffic expertly, and she is beating chauffeurs at their own tricks in city driving.

"Just now few women venture taking their cars out over country roads alone. Thoroughfares outside city limits have offered rigors and discomforts that she is

unwilling to put up with on a pleasure spin. Usually, the trip out through the country is postponed until Saturday or Sunday, when a man can preside at the wheel.

"Level and solid roads, kept up the year around, are going to place the sunshine and good air of the country at the feminine driver's pleasure every day in the week. Highway improvements will make a wholesomer woman by extending her touring radius in part where she needs most to go. There is nothing that will smooth out a tangle of household affairs like a dash through fields and wood lots for a good breath of fresh morning air.

"The man of the house will find that a morning spin will place a pair of sparkling eyes and a face as flush with color opposite him at lunch as he is likely to see for days to come."

### Lincoln Highway Electrically Lighted.

The Lincoln Highway is an instrument of extreme value to the various municipal and civic bodies in the cities along its route in that through their association in being on the Lincoln Highway the many progressive steps and acts of civic betterment and advancement are more quickly communicated to one another and followed. The latest instance of this fact is the announcement that that section of the Lincoln Highway between Aurora and Geneva, Ill., a distance of ten miles, is to be electrically lighted for the benefit of travelers at night. This follows close upon the news that a rural section of the Lincoln Highway leading out of Salt Lake City, Utah, has been so lighted and proves the value of the closer communication established through the development of the Lincoln Highway.

Aurora is known as 'The City of Lights,' and the new arrangement will complete a system which is now favorably commented upon by all visitors. Decorated Lincoln Highway lights are found along the route of the Lincoln Highway by Aurora and electrically lighted warning signals have just been placed at the street car crossing. They were supplied by the local automobile club and the street car company furnishes the power.

### Electric Vehicle Convention.

A conspicuous and important feature of the forthcoming convention of the National Electric Light Association at the Congress Hotel, Chicago, May 22nd to 26th, will be Electric Vehicle Day under the auspices of the Electric Vehicle Section of that organization. It may be interesting to note, that the Electric Vehicle Association of America, after six years of very successful activity, affiliated with the National Electric Light Association, in order that through centralization of forces, a greater drive on behalf of electric vehicle introduction would be made. The powerful and far-reaching influence of the 6000 Central Stations (electricity supply companies) coupled with the natural advantages of the electric vehicle, assures speedily a success which otherwise might not have come so rapidly.

Banks of Oxford, N. C., and Smithfield, N. C., offer prize of bank book deposit to each rural school in county for best essay on good roads.

The Meridian Highway, the paved way, has been routed through the greater part of the state of Texas, under the supervision of Mr. D. E. Colp, secretary of the good roads association.

# The People Want Federal Aid

**For Years There Has Been Insistent Demand That Roads Be Recognized by Congress**

**F**AIRFAX HARRISON, President of the Southern Railway, is president also of the American Highway Association. He is deeply interested in the success and prosperity of both, because, though in no sense related in management, both are working in their separate ways for the public benefit. The Southern Railway system has a total mileage of 7,022 miles and reaches every important commercial and industrial point in the Southern States. Under the policy adopted by Mr. Harrison's predecessors, the Southern System has conducted for five years an active campaign looking to the development of the territory reached by its lines. Through its Land and Industrial Department it has attracted thousands of industrious people to establish their homes in the South and by means of its good roads trains and experimental work it has demonstrated the great value of improved highways to farmers and merchants and manufacturers. The Atlantic Coast Line and the Seaboard have also done invaluable work of the same sort, so that the South is no longer an undiscovered country but is yearly attracting steadily increasing attention from investors and homeseekers.

The American Highway Association has been publishing a Good Roads Year Book containing a complete survey of the good roads movement—the status of the work in all the states and districts, the laws that have been passed touching the work, the methods of construction, the types of road best adapted to differing traffic, the engineering problems with which the builders must deal and how to solve them, the intimate relation of improved highways to individual and community interests, questions of cost of construction and cost of maintenance, so that the Good Roads Year Book has come to be a trustworthy compendium of all that relates to this great question. The Year Book for 1916 is now in press and will shortly be ready for distribution. The preface for this volume has been written by Mr. Harrison in which he sets forth the purpose of the American Highway Association—the “intelligent and effective use of the large funds actually available” for road building.

During the year 1916 it is not unlikely that about \$300,000,000 will be spent on highways and highway bridges in the United States, or about as much as one-third the cost of the Federal Government for the fiscal year 1913-14. The average citizen who is asked to vote for the issue of highway bonds and who pays road taxes, as well as the expert, has the right to know how the money is expended and that it shall be expended for road-building and road maintenance so as to obtain the largest economical results. That such results may be reached the American Highway Association has entered upon a campaign of education, by bringing together in its book of books “a general outline of the methods in use in the different states of conducting road improvements and of raising funds for such work; an untechnical and practical explanation of different types of road improvements, culverts and bridges; a statement of the methods of maintenance and of preventing dust; a digest of the current specifications of the highway departments of several states where road

work is carried on extensively; an explanation of the principles underlying the different classes of bonds issued to pay for highway improvements, and finally to supply lists of manufacturers of machinery and materials for road work and of societies and clubs interested in the betterment of our highways.”

The building of good roads is “a man's work. It cannot be done “just so.” There must be definite planning and thorough system and capable supervision. “To make the best use of road funds they should be spent under the direction of men who have devoted their lives to the study and practice of road building.” These men must be paid adequately for their services, and these services should be available for all the counties and districts through which the roads under construction run. It may not be practicable for single counties to employ the best engineering ability in the construction of their roads but this difficulty can be largely overcome if the counties will all join in the work of building up the state highway departments from which they would be able to obtain such technical advice as might be required in the solution of their several difficult problems in road construction and maintenance.

There has been for years an insistent popular demand for Federal aid in the improvement of the public highways on the ground that such improvement would render more efficient the delivery of the mails on rural routes, would contribute directly to the parcel post service, and would immensely improve the conditions of country life. Many bills have been introduced in Congress from time to time looking to the attainment of these objects, and at the present session of that body a bill has been passed by the House by an overwhelming majority making provision for the aid desired. This bill has gone to the Senate for consideration. With modifications it has been favorably reported to that body and will doubtless be passed at the present or the next session of Congress. Both bills provide for substantial Federal aid to the states which have efficient highway departments and which under the direction of such departments will expend on the post roads an amount equal to the amount provided by the Federal Government.

The proposed legislation conditions the extension of federal aid to the states for road construction and maintenance and imposes severe but entirely wholesome restrictions upon the methods by which federal aid can be made available to the states. If the states are furnished with well-organized and competent highway departments, and will conform to the requirements of the law, and co-operate with the Secretary of Agriculture in carrying out the methods for the conduct of the work which he shall prescribe, they will share in the distribution of the funds appropriated by Congress for this work. There is to be no free distribution of these funds. The states must put up as much as they take down. The government at Washington will play no favorites. “The construction (of the roads) is to be done by the states, subject to the approval of the United States Secretary of Agriculture, and fu-

ture federal aid will be withheld from the states which fail to maintain properly the roads constructed with such assistance." The states with highway departments will be first to share in the appropriations made by Congress, and with this incentive to the practical consideration of the subject it is taken for granted that in a short time there will be highway departments in all the states. With community of effort and interest in this great work between the General Government and the states, and competent direction and hard service the time will come, speedily, when the public

roads of the country will be a credit to the country and and there will be at all seasons well-constructed highway for the business of the people.

In his proclamation, or preface, as it is called, President Harrison says: "All who believe in getting a dollar's worth of goods for every dollar invested in construction or maintenance of highways are invited to join the (American Highway) Association and thus bear witness in an active and positive way to their co-operation in a work of great economical and social value."

## Recent Tendencies in Stone Block Pavement

By MAJOR W. W. CROSBY  
Consulting Engineer, Baltimore

THE speaker has for several years advocated the use of a stone block smaller and better dressed than has been generally customary in American practice. He has believed that many of the objections that have been found against even the best of pavements laid with the larger block would disappear if a smaller block were used, and that this would be especially true if the reduction in size were accompanied by better dressing of the blocks so as to permit thinner and more uniform bedding layers, narrower joints, and smoother surface to the pavements.

Some general progress in this direction has been made in the past few years. The speaker has been gratified at the satisfactory results reported and at the development of the arguments for continued and extended progress toward the end of the most satisfactory evolution of that extremely valuable and efficient street surfacing, the stone block pavement.

Recent blocks were referred to Tuesday by Mr. Compton, and of late years attention has frequently been di-

pavement is coming to be generally recognized, and it is also coming to be agreed that evenness in thickness of the bedding layer or cushion of a block pavement is fundamental to such uniformity. This necessitates a uniform depth for the blocks themselves, and the range of depth or variation between individual blocks must be proportionate and not disproportionate to the size of the blocks. Hence the danger in the use of the smaller re-cut blocks lies at present, when ordinarily the re-cutting and redressing done does not bring about a fairly close evenness of depth, in the neglect of this factor.

The speaker believes his statements are especially true whenever sand or similar material is to be used as a cushion or bedding layer for the blocks, but that the effect of the principles involved may be somewhat lessened, though not always wholly avoided, by the use of a mortar bed in place of the sand.

### Progress in Virginia County.

A road bond election was held recently in Floyd District of Scott county, Va., and resulted in a majority of eighty-eight for the bond issue. The amount of the bonds will be \$43,500. Floyd is a small district and adjoins Wise county, in which good roads have already been built. A year ago an election in the same district resulted in a defeat of a bond issue by a majority of two.

There are seven districts in the county and four of them have voted bonds—Estillville District, \$175,000; Johnston District, \$40,000; Fulkerson District, \$37,000, and Floyd District, \$43,500. About sixty miles of road was graded last year and ten miles of macadam put down. A convict force of fifty is kept busy on the stone work, and several miles more will be graded in the Estillville District. Johnston District also will finish the sections, making a through road to Washington county.

Elections will be held this year in the remaining districts of the county.

William D. Melton, of Columbia, has been chosen as chairman of the road commission of Richland county, S. C., which recently voted on a million dollar bond issue for better highways.

Washington and Philadelphia are now connected with a direct route good road for the entire distance of 140.7 miles.

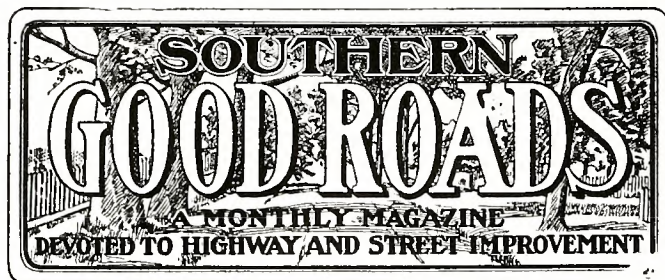


Four Mules Haul 20 Bales of Cotton, Worth \$1060 Cash, Over Six Miles Johnston County, N. C., Good Roads, December, 1915.

stances of success have been reported although comparatively little time has elapsed for the service test of the particular idea.

It seems to the writer, however, that successful results may be expected from the improper use of the re-cut large blocks, both from the reduction in size of the block and the better dressing of these blocks which incidentally takes place in the operations, provided one important feature is not neglected. That feature is the securing of a reasonably uniform depth for the re-cut blocks.

The necessity for uniformity or homogeneity in a



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No. 5.

**HELP BREAK THE BARRIERS.**

For more than half a century after the landing of the original colonists on the Atlantic seaboard few men dared brave the perils of the mountain journey that would take them out to the Middle West. By and by such brave souls as Daniel Boone blazed trails through the Appalachian forest and went out to a new frontier. The seed corn planted by these pioneers soon developed into a growing empire that demanded railway facilities. Then came the building of great trunk lines of roads by men who dared place fortunes into the work of cutting through mountains of stone to reach a rich objective. Beyond this western frontier lay the Pacific Coast country, rich in untold resources, but only the brave dared risk the perils of the wild and high mountains that set it apart. But the pioneer spirit again bore fruit and these people demanded railroads. The United States government opened its purse with lavish hand and a number of great roads were cut through the barriers imposed by nature.

But to the average man the barriers are just now beginning to be removed. The age of the prairie schooner has gone to abide with the memories. The railroad age has reached a high plane of development, but growing up beside the railroads are a system of modern highways, over which will be carried many times the passengers hauled by the railroads. Over the country roads must be hauled products of ten times the value

of those hauled by rail. A great bulk of the food for all the growing cities must be carried over the public highways. The increasing use of motor driven vehicles makes the building of good roads in all sections more and more a vital necessity.

The great majority of the Congressmen and Senators at Washington are dependent for their seats in Congress upon the votes of the great mass of people who live in the inland districts. For many years they have been voting huge sums of money to build dams in arid lands, dig ditches in swamps that have only the hope of a future trade development, dredge rivers upon whose bosom no traffic of consequence is carried. And all these years the great arteries of the nation's life, the life veins of the rural communities, have been disowned by the National body. Here live the people who make up a large portion of the nation, hampered in their development by a parsimonious policy of Congress toward road development. For the next twenty years at least the great problems of internal development are going to hinge around the building of good roads and not the dredging of insignificant streams. In many cases, however, the sums spent for river and harbor improvement are justified. But at best these improvements are little more than local. This money is spent without a cent of local aid, while at the same time the great states of the Union, with millions in their hands that they are paying out of their own pockets, come asking the Federal government in a small measure at least to grant a supplementary fund. Their requests get far enough to be embodied in bills, but these bills are quietly tucked away in some committee pigeon hole.

The people have the remedy for this situation. They have the votes to compel recognition for the great good roads issue. Let your Congressmen and Senators know that the public highways of the country have just as much right to attention as have the swamps and deserts. There are millions of acres of land that would yield bountifully but there is no economical method of transporting the products to market. The folks who would move to these outlying districts would have to isolate themselves from a greater part of civilization, because they had no road to get to school, church or market. Congress will do little with this matter until Federal Aid is demanded with increasing force. The day has come to press this demand without ceasing.

**From Snow to Palm Trees.**

Passing via the automobile from the show-deep roads and streets of the north to the smiling palms and sunny bathing beaches of the fashionable Florida resorts, is becoming increasingly popular.

Reports from Palm Beach, now more than ever the winter vacation capital of the American fashionable world, since the war in Europe has virtually restricted outings to the home country, show many Pierce-Arrow and other high-class cars constantly arriving.

In one little budget were noted the names of A. M.

Pride, of Wisconsin; R. M. Turner, of Newark, and C. C. Van Dussen, of Saratoga Springs, all driving Pierce-Arrow cars and all terminating their journeys in Florida.

Journeys of this kind are popular because they beget vivid contrasts. It adds more to the enjoyment of going south. In the minds of many persons, if it is possible to see en route the kind of weather that is being escaped. It is something to make a start when snow is clattering the streets, when ice has formed its grip around telegraph wires and sleet has perilously complicated walking, for a section of the country where there is no nip in the air and where midsummer invites all the joys of surf bathing.

Rains and floods are a possibility part of the way; roads deep in mud and water constantly present their complications. Snow and sleet, swollen streams, bitter windstorms, all these attend the transit in its earlier stages and give a rough, rugged kind of a joy to the trip.

But once entrance is made into the southern state—when Georgia, for example, is reached, the turn comes. Every hour from that point adds to the comfort and charm of the trip. Snow disappears from the landscape, touches of green begin to take their places in the woods, an occasional blossom is seen, the air takes on its first warm, fresh breath of spring, and ending it all is Florida, with its combination of beauties of nature and polite social diversions.

Notes from the palatial hotels of the Commonwealth of beauteous blooms prove that the motorist is taking advantage of his opportunities.

### Three Brothers in Big Auto Races.

For the first time in the history of the sport, three brothers will drive a team of cars in a speedway race. The entry of three Frontenac cars is announced for the sixth annual international sweepstakes race to be held on the Indianapolis motor speedway May 30.

Charter members of speedway fans will be delighted to learn that Louis Chevrolet has "come back." Of the famous stars of those "good old days," Chevrolet alone remains. He will drive a car of his creation this year, which he calls "Frontenac." Three Frontenacs are entered, the other two to be driven by Arthur and Gaston Chevrolet, brothers of Louis. They have built their cars, which are said to contain some radical construction features.

Although much faster time has been made since the days that Louis Chevrolet, Burman and Strang thrilled thousands by their performances, perhaps there has never been a school of drivers so daring as those who were tutored under the famous Bill Picken. These men were the forefathers, as it were, of the type one sees today in speedway racing.

Louis Chevrolet is not what one would call an old man, but he is in every sense of the word a seasoned veteran and his very personality seems to radiate adventurous romance. Nevertheless, he is decidedly practical, as evidenced by his ability as an engineer. He won various short distance events on the Indianapolis track in the early days, and it has always been his secret dream to annex victory in one of the international sweepstakes events. He retired from racing and for some time was lost in the prosaic business of designing and building cars for commercial purposes, but the lure and fascination of the speed game has called him irresistibly.

His many admirers will be more than glad that he

has re-entered the racing game and will expect wonders from him in his new Frontenac. This is said to have an aluminum engine and every part is said to be built according to Louis' own design, from the motor to the rear axle. Light weight has been his prime object and his completed car is said to tip the scales at not more than 1,750 pounds and to develop a minimum of 125 horsepower.

### North Carolina Good Roads Association.

The Annual Good Roads Convention held under the auspices of the North Carolina Good Roads Association will be held at Wilmington and Wrightsville, North Carolina, June 20, 21 and 22. The Board of County Commissioners of New Hanover county and the Chamber of Commerce of Wilmington are making elaborate arrangements for this convention and it is expected that it will be the largest and most successful good roads convention ever held in the state.

They are planning a Big Day to be known as "Governor's Day" when special trains will be run to Wilmington from Goldsboro, Fayetteville and perhaps other places.

The auditorium which is being built by the Tidewater Power Company is expected to be completed by that time and the convention has been invited to hold its sessions in that building. Delegates will be appointed from all the counties and cities of the state and those attending will have an opportunity of driving over the splendid system of roads of New Hanover county and becoming acquainted with the system of maintenance that is successfully maintaining the county's roads.

### Concrete Road to Hopewell.

The state highway department has awarded contracts for the construction of the concrete road which is to connect Petersburg with Hopewell. As soon as the materials can be assembled the work will begin. The contracts will call for the completion of the road by Nov. 1.

The cost of the new road will be between \$115,000 and \$120,000. Of this amount the DuPonts will contribute \$25,000, the city of Petersburg \$25,000, the county of Prince George \$40,000, and the balance to be raised by private subscription. The road is to be nine miles long and twenty four feet broad, with concrete as its surfacing material. It will be the most ambitious undertaking of its kind so far attempted by the state highway commission.

### Maryland to Spend Nearly Three Million More on Highways.

The legislature of Maryland will pass a bill limiting the general loan to \$3,000,000 for 1916-17. This has been fully decided upon after a conference between Gov. Harrington and the leaders in both houses at a meeting just held at the executive mansion. Of this loan \$2,100,000 is to be used on the state roads, \$175,000 for a new main building for the State Agricultural College at College Park and the rest for small armory and normal school at Frostburg.

The bill will not specify the sections where roads are to be built or extended, this power being left in the hands of the incoming roads commission, which will consist of three members instead of seven, and its chief engineer.

# Ministers and Good Roads

## Success of Gospel Ministry in Country Facilitated by Better Mode of Transportation

**A**S Mr. James Bryce says in "The American Commonwealth," "the school is becoming the nucleus of local self-government in the South now, as the church was in New England two centuries ago," and both ought to be actively identified with the good roads movement, without success of which neither can attain that degree of prosperity essential to the welfare of the whole community. The direct and immediate effect of improved highways upon the educational institutions in the country districts has been freely discussed in these chronicles. The building of modern school houses, the extension of the courses of study, the employment of community wagons for the transportation of pupils from wide districts to and from the school centres to their respective homes, the advantage of converting the school buildings between terms or on the days when "school is out" into community forums for the discussion of public questions of large moment or for such variety of public entertainment as the people might desire, are all subjects that have been treated by many wise and thoughtful leaders. In the consideration of the good roads problem strange to say, however, one of the most influential bodies of workers has been passed over with little attention. The country doctors, whose labors are abundant and poorly rewarded, have been invited to take an active part in the good roads movement for their own benefit and the benefit of the patients who depend upon their ministrations for relief in their times of distress, and equally with these Samaritans are the country preachers whose mission it is to administer to the soul while the physicians are doing their best for the body.

### Help the Minister's Work.

In 1914 there were 178,313 ministers, including the clergy of all the churches or denominations or sects in the United States who were ministering to 225,486 churches representing a membership of 28,805,599. The larger number of these ministers were engaged in the work of country parishes or congregations. They are all deeply concerned not only for the spiritual welfare of their flocks but for their material comfort as well. In the pursuit of their abundant labors they have found how difficult, how at times almost impossible, it is for them to do their work because of the impassable condition of the roads over which they must journey on their missions of mercy. The most of them are ill paid, many of them actually live from hand to mouth; the average salary of the country minister probably does not amount to over \$400 the year, and how they live only the Lord knows. Take the Episcopal church, for example, which is said to contain "the richest church membership in the United States," and there are 4,420 men employed in its active service. The average salary of its ministers is \$1,200 the year, all of which, however, is not paid in cash. More than 2,500 of its clergy receive less than \$1,500, and only 237, including bishops, receive \$4,000. Over 700 are paid less than \$1,000. The "Southern Churchman" says they "are expected to have a good education, to dress well, to live and move among people where rents are high, keep open house, always ap-

pear cheerful and preserve their physical vigor." In the main they do all this, and as one of the Washington rectors said recently, "the preachers are the true economists of the age and do more for less money than any other workers in the land." The American Highway Association, unfortunately, cannot "raise their wages," so to say, but it can tell them, not only the Episcopal brethren but all who work in the same field, how, by the exercise of their admittedly great influence, they can help particularly to improve the condition of the preachers employed in the rural districts.

Preaching one or two sermons on Sunday, however important, is not by any means all that the country parson is expected and required to do—his pastoral work is as important as his preaching service. His parish generally covers a great stretch of country and his congregation is widely scattered. He must keep in close touch with them if he is to exercise the duties of the ministry with which he has been charged. In the older and really better time in New England and throughout the country, the country parson was the guide, counselor and friend of all his people. Being the most learned man in the community, he was consulted by his parishioners on all questions of public and domestic concern and wielded a tremendous influence in society and upon the body-politic. He was the oracle of his parish, kept fully advised upon public questions and their relation to the public morals, and where he led the people followed. In spite of the general dissemination of knowledge and the disposition of the crowd to do as it please, he still is, or ought to be, the most influential man in his neighborhood—and he would be if he would only in his secular moments manifest an active interest in the practical affairs of his parish.

One of the most practical affairs with which the people have to deal is the building of good roads, roads which would tie the country and town together, which would make neighbors of those who dwell miles apart, which would afford the means of easy communication between the country doctor and his patients and between the country parson and the members of his church. The country parson finds it possible only at the expense of great nervous energy and physical exhaustion at certain times of the year to keep in touch with the members of his flock. He knows by hard experience the difficulty of riding or walking over muddy roads and through oceans of slush to those longing for his comforting presence in time of sickness and death, and how hard it is to convey to those who are ill the material things necessary to their recovery. It would be a great thing if the country parsons all over the land would agree among themselves to preach on a certain Sunday a sermon on the subject of good roads. The Bible is full of appropriate texts. Sermons are preached every Sunday on all sorts of social, ethical and political questions not one of which is of more immediate importance to the welfare of the community than the improvement of the public highways. The country parson who has not forgotten his "Pilgrim's Progress" will recollect what trouble Christian had

on his way to the Celestial Country by the condition of the roads and how terribly he suffered when he took the wrong turn instead of holding straightforward in the appointed way. There was one point, the "Slough of Despond," which the surveyors had been working above sixteen hundred years and into which they had dumped "twenty thousand cart-loads, yea, millions of wholesome instructions," and yet "it is the Slough of Despond still," although "certain good and substantial steps," had been "placed even through the very midst of this slough," and it is noted in the story what terrible things happened to Christian and Hopeful, his companion on his journey, when leaving the main highway they sought smoother ground for their tired feet and fell into the hands of Giant Despair.

For their own sake that they may do their work better, for the sake of the people to whom they minister in the rural districts, for the promotion of industry and the common good, the American Highway Association invites the active co-operation of the country preachers in the good roads movement.

#### Bond Issues in West Virginia.

During the past four years different counties and road districts of West Virginia had voted approximately seven and three quarter million dollars in bond issues for good roads, up until the first weeks of last month. During the latter weeks of April, in this month and June issues for a little over four million dollars worth of bond are to be voted on by the people of sixteen counties and districts. Previous to these elections in which Virginians are now in the midst, forty-one issues have been successfully carried. A blue print of elections carried, giving majorities and premiums for which bonds sold, has been issued, as is also all proposed issues for April, May and June. These are given below.

County	District.	Amt. of Issue.
Wood	Parkersburg	\$ 180,000
Cabell	.....	300,000
Hancock	Grant	125,000
Hancock	Grant	125,000
Hancock	Butler	125,000
Marshall	Union	150,000
Marion	Fairmont	400,000
Marion	Mannington	300,000
Mercer	.....	500,000
Pleasants	Washington	60,000
Wood	Williams	70,000
Wood	Clay	40,000
Hancock	Clay	40,000
McDowell	Big Creek	165,000
Cabell	.....	600,000
Kanawha	Poca	25,000
Kanawha	Union	50,000
Kanawha	Jefferson	90,000
Kanawha	Malden	45,000
Kanawha	Charleston	80,000
Kanawha	London	85,000
Mercer	.....	350,000
Summers	Talcott	100,000
Summers	Greenbrier	150,000
Wyoming	.....	550,000
Monongalia	Morgan	300,000
Preston	Portland	280,000
Preston	Kingwood	164,000
Upshur	Buckhannon	181,000

Doddridge	West Union	200,000
Marion	Fairmont	100,000
Hancock	Poe	50,000
Randolph	Leadsville	220,000
Raleigh	Town	300,000
Raleigh	Trap Hill	175,000
Raleigh	Shady Springs	135,000
Raleigh	Slab Fork	210,000
Barbour	Barker	130,000
Roane	Spencer	240,000
Greenbrier	White Sulphur	90,000
Wetzel	Church	240,000
Greenbrier	Lewisburg	153,500

Total \$7,748,500

#### PROPOSED BOND ELECTIONS.

County.	District.	Amt. of Bonds.
Ritchie	Clay	\$ 240,000
Wood	Clay	42,000
Wood	Tygart	70,000
Wood	Lutbeck	100,000
Roane	Geary	100,000
Roane	Walton	100,000
Wayne	.....	950,000
Logan	Logan	200,000
Marion	Lincoln	650,000
Ritchie	Murphy	190,000
Hancock	Grant	125,000
Nicholas	Beaver	250,000
Randolph	Beverly	100,000
Fayette	Fayetteville	600,000
Fayette	Kanawha	310,000
Fayette	Nuttall	100,000

Total \$4,107,000

#### Gravel Roads in Iowa.

"Personally I believe that the building of roads with gravel or with a mixture of clay and gravel will be the solution of the good roads question in Iowa."

Governor Clarke has this to support him, every state in the west is building largely of gravel, making pavements only where traffic is unusually heavy, as it is in town and city streets.

Gravel roads can be built at anywhere from \$500 a mile to \$2,500 a mile according to the cost of grading, the character of construction, and the length of haul.

Of course a gravel road needs attention after it is in, but not nearly so much attention as our present dirt roads, the cost of upkeep will be cheaper as we get more graveled roads. A graveled road is also dusty, but that can be remedied by a coat of oil.

In Clay county orders have already been let for a graveled road from Spencer to the south county line, and plans have been made for gravel roads to connect all the towns in the county.

Other counties are moving.

During the coming year more miles of really dependable road will be built in Iowa than Iowa has had in the whole fifty or sixty years of road making.

Henderson county, N. C., has spent \$200,000 in road and bridge building during the past three years.

The prospects for Federal Aid for good roads at this session of Congress appear to be rather slim. The Senate has side-tracked the bill indefinitely after its overwhelming passage in the House.

# Building The Meridian Road

By S. A. McNAUGHTON

**E**ARLY, for a fact, was the day when I first observed, that, when a community is thoroughly imbued with practical Good Roads enthusiasm, it always means a great deal more. It means better bridges, better culverts, better byways, better fences, better farms; and, better citizens. Just like the story of putting the beautiful flower in the outcast's shack—he commenced to strive after better and bigger ideals. That's the way it was when the post road was built from Austin to San Antonio; That's the way it was in the adjoining county of Williamson; and McLellan county; and Bell county; and Tarrant county; and all other counties that have striven after a particular highway. It was all in getting started.

Of course it was not altogether the construction; but rather the maintenance that was the ever present trouble. We say "was" for we now know that when any certain road construction is now proposed, maintenance will be figured on just the same basis as the primary construction; and if the maintenance fund is not in sight, the work will not be started until the money is forthcoming. On this same post road, above-referred to, "maintenance," like Banquo's Ghost, will not down. One good citizen has proposed a tax or contribution of five dollars from every owner of an automobile; but so far the "gasoline burners" have proved very forgetful. The only sure way, is as above stated, plan and pay for the tarviating or other top-dressing when the road is built, and maintenance will not be such a bugaboo.

They often talk about: "Back to The Farm;" but nothing has proved to be such a force as this very matter of good roads. It is a fact, demonstrated almost daily, that with better roads, even, many men in the city are seeking the country. Good roads have made the country home not only possible but popular. While, with good roads and rapid locomotion, the man in the country has had avenues opened up neevr before dreamed of. Markets have been created that never even existed before; while relations, both commercial and social, are established that are easily seen to be mutually advantageous; while living has been made doubly worth while for the man who has to live in the city; and the man who has the good fortune to call the country his home.

Good roads have another and real important phase: It is the pleasure seeker and the traveller. When he knows that, for miles and miles, there stretches in a desired direction—the way he wants to go—a perfect road, forthwith he sits up and takes notice. That's the road that appeals—For instance, the Meridian road from Winnipeg, Canada, in a direct line across the United States, from the northern limit, to the city of Laredo, Texas, southern limit on the banks of the Rio Grande. A road 1906 miles long, while by railroad it is 2175 miles; travelling through six states; touching one state capitol, Austin; traversing thirty-eight counties; and touching fifty-one seats. The states traveled are Canada, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas, each having a state division, and the state divided into county organizations—thus each and every individual has a direct interest in the greatest National Highway in the world.

In the month of June, 1911, the Meridian road was

first mooted in an organization, at Salina, Kansas; and from that day the interest grew and expanded until it is in as much favor in the uttermost ends of Texas as it is in Kansas. Further the different counties along the Meridian Road in Texas alone have voted \$8,908,000 in road and bridge bonds to boast of an all-year, high-gear road, though you cannot joyride anywhere on its entire length; but you recognize the Meridian road in its economic usefulness as a thing of beauty and a joy forever. In verification of this, the plan is to have a no-stop auto run from Winnipeg to Laredo, which will demonstrate the fact that a letter can be carried the entire distance of 1906 miles in seventy-two hours. When this no-stop run is made, it will create more excitement than any innovation ever attempted in this country; and will but mark a new era in auto transportation.

Another distinguishing feature of the Meridian road is that it will be marked with the colors—white, straight ahead; and red and white, turn—the entire route from the semi-arctic to the semi-tropic. That's why so much importance attaches to the logging trip through Texas, now being undertaken by D. E. Colp, vice president of the Meridian Road; and Lake Robertson and "Yours Truly," who started out from Laredo the last day of last year; and will, starting again Friday, March 24, 1916, complete the northern end of the log of Texas; gathering data, for descriptive book illustrating scenes along the way, with a brief mention of each and every place visited, which will be issued in conjunction with the official log of the road in the Texas division, and we are presumed to make of the same one of the best boosts the Lone Star State ever had. We are pleased to say, that already Texas is enjoying no little publicity from this very trip, for the last letter, written by the publicity representatives of the road in Texas, besides being published in sixty newspapers in this state, was, by request, published in one hundred newspapers (outside of Texas) along the Meridian road.

It is very interesting to note that, besides this being now the Meridian road, it will also, in Texas, be designated the International Pavedway, the great road that is to bisect the United States in all its beauty and interest, from the great lakes to the river that marks the northern boundry of Mexico. All being in this state under the auspices of the Texas Good Roads Association of Texas Division of the National Highways Association.

And all that remains now to have Texas generally on par with good roads boosters anywhere and everywhere (remember we jumped from nothing to third in rank in Good Roads), is the passage of a State Highway Department Law, which has been advocated and voted for unanimously at every good road rally and meet held in the state; and without which our labors are of not much avail. Otherwise, the prospect in Texas for better and more substantial roads was never brighter than today.

Fentress county, Tenn., will build 33½ miles of good highway this spring and summer, contract having previously been let, with \$150,000 available for purposes of construction.

## Dixie Road Breaks Barriers

**F**IELD Secretary W. S. Gilbreath, of the Dixie Highway association, recently had the following, among other things to say about how that Highway affects Florida and the other states of the South:

Someone asked Carl G. Fisher "What is the greatest advertisement, advantage and benefit to any town or city?" His immediate reply was "Good roads and streets and a clean city." I have traveled far and seen a great many of our American cities and have noticed in myself, as well as in conversation with thousands of others, that the first impressions of a city are as a rule the most lasting.

Invariably the motorist judges the city by its approaches and as it is stated that 50 per cent of the travel is over 10 per cent. of the roads it stands to reason that a city's approach is usually and in fact is the 10 per cent., and as a rule the worst part of its approach, because of the fact that it usually receives no more and generally not as much care as that directly within the most populous district. How then to determine the exact limits to which a city should go in influencing the question of road building, is the question.

The cities of Minneapolis and St. Paul conducted an investigation through their civic bodies several years ago and published the findings in a pamphlet called "The Burden of Bad Roads." It was discovered that from the replies received from over 4,000 farmers their own estimate of losses accruing from their inability to reach their legitimate market totaled \$747,149.80 for a given period. On the other hand, the business men's estimate for the same period was \$910,000, a grand total of \$1,657,149.80. Quite some loss.

Now, it is estimated that the cost per ton per mile averages 26 cents to the farmer for hauling in the United States. If this is the case, someone must be paying for it, as there are thousands who are hauling goods at the cost of over \$1 per ton per mile.

How far does Jacksonville's interest lie? Certainly in one degree to her county lines and it seems to me she should bend every effort to see that every main trunk line to her county lines should be permanently hard surfaced. If I were a merchant citizen of this city, I would consider the matter from an economical standpoint and feel that it was to my interest in building up the entire city. My patriotic, public-spirited duty. We are all more or less selfish. We consider our self-interest first, which is perfectly logical.

### "War Babies" and Their Work for South.

You are getting your war babies now. They have been coming down here by the thousands and many are returning home to tell of the things of Florida. It would surprise you to know just how many will go back and specifically mention the roads of this one county alone. It would surprise you to know how many are planning to return again and how many have said they would not come again until the road situation is improved.

How many who have not been here and want to come are asking about conditions? I personally have answered thousands of inquiries and I know that next year you will see more than ever, but not half of what is your just due, because of the burden of bad roads. This again brings us to the question of your market limits, and I will say that they are as far extended as

the limit of automobile travel. Maine draws travel from as far west as Denver and she counts the money spent in hotels and garages alone in one season at \$80,000,000.

Draw a line from Rochester, N. Y., to Chattanooga, Tenn., and another from Fargo, N. D., to Chattanooga, and within those lines you have a market so large most people can hardly realize it. Of the cities in the United States with a population of 100,000 and over, thirty per cent. lie there. The automobile registration shows a million cars directly tributary and accessible. The greatest travelers by automobile lie there and thousands came to men in my office when I was connected with the Hoosier Motor club and asked: "Can I get into the south? Can I go to Florida?" On showing them road conditions their almost universal reply would be: "Well, I guess I shall have to tour east or west."

What does this mean to Florida and the south? It means that you are losing the interest of thousands who have the money to invest. You are being retarded in a growth which you should have.

Why, with your advantages, Georgia alone is a good field for you. Recently in Atlanta, Thomasville and Albany prominent citizens asked me if it ever would be possible to get into Jacksonville from their cities by automobile. I want to take my car and my family with me for a couple of weeks in and around Jacksonville.

How about this? Can you see it? Is it worth while? I think it is and I think the Dixie Highway association with its band of great public-spirited men from that eminent gentleman, Judge M. M. Allison, our president, on down through the list, is doing more for you and the state of Florida than you realize at first. The wonderful work of these men deserves to go down in history as an example to our sons of what can be done in a great cause.

The breaking down of the mountainous barriers which are holding back this horde of people is no small task. It means labor and constant effort. It means diplomacy and tact. You as a city, yea as an entire state, could not afford to employ these men to do for you what they are doing in actual constructive work to say nothing of the advertising feature.

As you are no doubt soon to go into a campaign of advertising on your own hook, let us look for a moment on what the Dixie Highway association has already done. We have not had all the clippings of articles dealing with this Dixie highway, yet we have enough to show us that in newspapers of a circulation of 10,000 and over we have in less than a year received 10,000 columns of reading matter, or 1,000,000 inches. This is alone in newspapers and does not count magazine or trade paper articles. All of it has been space that you could not buy at any price, and yet, if we figure it on an average basis of advertising, it would cost you over \$700,000.

Is it worth your while to support the Dixie Highway association? I am going to appeal to your intelligent self-interest for an answer.

You can see from this where your markets lie, your county, your neighboring state, and the great middle west, and you cannot afford to let the approaches, great and small to your city, retard your progress or deprive you of your just dues.

# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### Oklahoma.

Practically one hundred miles of highway in Oklahoma county has been put into good condition since the first of September. The work has been done by road gangs under the direction of Captain Mike Casey, County Commissioner Roy Z. Taylor and County Commissioner B. W. Black. Much of the labor has been done by county and city prisoners.

The road has been metaled with broken rock and red clay to a depth of twelve and fifteen inches, the culverts have all been built of concrete. Every yard of the one hundred miles is twenty-four feet in width, giving ample space for the passing of as many as four vehicles.

Captain Casey's camp, now located east of Edmond, has built forty-three miles of the road. Taylor's outfit, now stationed near Jones City, has constructed about twenty-five miles, and Black's gang, working at the present time in the vicinity of Luther, has completed about twenty-five miles.

Farmers have given valuable assistance in keeping the roads in good shape after the builders have completed their labors, according to Casey. He says that following every rain the land owners are out with their teams and drags shaping up the roadways.

The work mapped out for the highway constructors by the county commission is only about half done. Under the original survey, there were 228 miles laid out to receive their attention. If no obstacles are encountered, it is probable the entire job will have been finished with the end of the year.

\* \* \*

### Kentucky.

Responding to a call sent out by the Somerset Board of Commerce delegates from eight counties in that section of the state gathered in April and organized the South Central Kentucky Good Roads Association. The meeting was largely attended, the courtroom being filled with enthusiastic good roads boosters. The counties represented were: Pulaski, Lincoln, Rockcastle, Laurel, Whitley, McCreary, Wayne, Russell, Casey, Scott county, Tennessee. Other counties are expected to join.

The following were elected officers of the association: President, Judge R. F. Jasper, Pulaski; vice president, Dr. S. F. Parker, Pulaski; secretary, C. C. Thomas, secretary Board of Commerce, Somerset; treasurer, William Hurst, Rockcastle.

The Executive Committee is as follows: Rockcastle, L. W. Bethurum, T. J. Nicely, William Hurst, E. R. Gentry; Lincoln county, K. S. Aleorn, Judge J. C. Bailey; Casey county, J. C. Jasper, Robert Carson; Russell county, D. C. Harrer, Elam Harris; McCreary county, P. P. Walker, W. A. Kinne; Whitley county, H. C. Burnson, B. F. Rose, county judge; Scott county, Tennessee, W. H. Potter, W. M. Todd; Pulaski county, W. P. Smith, H. C. Kennedy; Wayne county, J. Sandusky, A. J. Cress; Laurel county, Judge W. L. Brown, W. E. Mathews.

May 13 was set as the next meeting date at which time the association will meet at Somerset to adopt a

constitution and by-laws. In the meantime each county is urged to organize a local association and attend the district meeting at Somerset.

State Roads Commissioner R. C. Terrell addressed the meeting and urged cooperation with the state department. He recited the great work that is being done by the state in the building of roads. Nearly all the counties in the meeting have voted bonds and are ready to begin building roads. The counties that have not voted bonds have elections called now. It was freely predicted that within five years every county in this section would be "piked" from end to end. Pulaski county will begin May 1 to build 100 miles of pike connecting the county seats of Rockcastle, Lincoln, Laurel, Russell and Wayne with Somerset. All routes have been selected and surveyed and everything is ready to begin work.

\* \* \*

### Iowa.

Announcement is made by the management of the Burlington railroad that it is to co-operate with government and state officials in a campaign of education for better roads.

The first Burlington "good road special" will tour Iowa, for five days. Government officials and state "good road" lecturers will give lectures and demonstrations. There also will be a complete exhibit of road building machinery and models of all kinds of roads, including those of dirt and pavement construction.

\* \* \*

### Tennessee.

The work of closing the uncompleted gaps in the system of highways centering at Bristol is being pushed throughout this section, and special efforts are being made to open the Bristol-Lexington Highway, which is a part of Boone Way, for motor travel by next fall.

The State Convict Camp which has been engaged in building some branch roads in Lee county has been moved to the main line of the Boone Way, between Pennington Gap and Stickleyville, and will continue the work until the road is macadamized to the Scott county line at the top of Powell Mountain near Duffield.

Beginning at Cumberland Gap a few years ago, the Convict Camp constructed 21 miles of macadam on Boone Way to the White Shoals district line. From that point to Jonesville there is a gap of about 12 miles of the old Fincastle Road for the construction of which bonds are expected to be voted next winter. From Jonesville to Pennington Gap the road is macadamized a distance of 12 miles; and from Pennington Gap to the Scott line the funds have been provided with which to macadamize the entire distance of 18 miles, of which more than ten miles has been graded. The entire 60 miles of Boone Way through Lee county will be open for motor travel by the first of July, and nearly 40 miles of it will be macadamized by fall.

Taylor district in Scott county is expected to vote bonds early this summer with which to grade the road

from the Lee county line to Clinch river to connect with the road graded and to be macadamized by the Estilleville or Gate City district, thus providing a graded or macadamized road to Bristol from Cumberland Gap.

\* \* \*

### Kentucky.

State Road Commissioner Terrell says that 106 counties out of 120 in the state have asked for the state aid fund this year. Only three counties that received state aid last year failed to apply for it again this year.

This indicates that, regardless of voting bond issues, the people of Kentucky are getting down to road-building in real earnest. Taking only their annual al-

lotments from the state aid fund every county that appropriates five, ten or fifteen thousand dollars per year to the construction of permanent roads will get an equal amount of aid from the state. This is the slower method, but it is twice as fast, and more, than the old plan.

Fewer counties than one would surmise, since the decision of the courts that only a majority vote is necessary, are preparing to vote on road bond issues this spring. In a few counties like Henderson, a controversy between the fiscal courts and the citizens who demand a commission for road-building, is retarding the great road-construction scheme to which all Kentucky seems alive. This is unfortunate.

## The Farmer and the Good Road

COME, gentle Spring! ethereal Mildness!" That is how old James Thomson felt about it something like two hundred years ago, and a little later Reginald Heber, following his cue, or venturing among the Muses on his own account, sang of the time "when Spring unlocks the flowers to paint the laughing soil." Which leads the American Highway Association to point out that the spring thaws and spring rains will soon be here to remind the people who run about from place to place, and particularly the farmers who live out in the country among the birds and flowers, how grave has been the neglect of the public roads in the largest part of this so-called "highly favored land." This neglect has been almost criminal because the people have sinned against the light, in that they have not obtained the advice and counsel, necessary to the improvement of impossible conditions, readily available for the asking from state and national road officials. Either they have failed to ask for such advice and counsel or they have disregarded it when they have received it, and with the result that at the happy spring season, when the heavens are bright overhead, the roads are sloppy under foot, and the farmer and his family find themselves isolated from their neighbors, from the schools, from the churches, from the market towns, from everything that makes life worth living. Yet men wonder why it is that there has been a steady drift from country to town, and why the young folk, when their wings have grown a bit, take flight from the delights of rural life to the crowded confusion of narrow streets and artificial horizons.

The farmer's income is small and his taxes always seem large. He does not see in the spring thaws any other lesson than that of inevitable dreariness. He and his neighbors often cannot pay for hard roads yet. He knows that for a large part of the year a well-dragged earth road affords satisfactory means of communication, and so he waits patiently until the water soaks away somewhat and otherwise lets things drift. He could not make a greater mistake. He ought to know that the preliminary essentials for good road building for light country travel are not expensive, and when the spring brings its troubles in a few weeks he can utilize the conditions of discomfort, if he will, for learning some very important things about rational rural road building.

In the first place, he should consider the very important feature of road location. In some parts of the country, roads were located years ago without much respect to grades. As a result horses strain at their

traces through muddy bottoms, where nobody lives, to the tops of windy hills with their journey only half begun. The re-location of parts of roads so that there will be only easy grades and so that places may be avoided where the maintenance of a good surface is troublesome is not beyond the achievement of ordinary common sense.

In a few weeks there will be no lack of evidence that the drainage of roads is of vital importance in most parts of the land. It will not be necessary to employ the highest talent in engineering to determine where better drainage must be provided. When the frost leaves the ground and the spring rains soak the earth, the soggy places will be clearly indicated to the dullest observation, and will show whether or not the road can be best improved by re-location, or by the digging of deeper ditches, or by the drainage of the contiguous land. There is nothing mysterious about it, which the farmer cannot understand; the drainage of roads is not different in principle from the drainage of land. The only reason the farmer is puzzled when road drainage is suggested is that in the engineering discussions of the subject which come to his attention unusual terms are used to describe things and conditions he knows by different names. He is bewildered by technical jargon, just as the most of us are puzzled at times by the jargon of the doctors. The terms employed by the engineers and the doctors are useful to the specialists because they convey exact shades of meaning to the specialists who need them, but they ought to be confined to the circle of specialists.

Some method of leading the water from one side of the road to the other is necessary. One great cause of bad places in roads is the use of poor devices for such a purpose. The culvert under the road ought to be so made that water passing through it will not keep the roadbed soft; it ought to be large enough to carry the water easily, and it ought to be located so that it will not become clogged. That is what an experienced engineer who can talk in logarithms when necessity says about it, and it is simple enough for the least scientific to understand. "All these requirements can be met by simple and inexpensive means that any intelligent farmer can use in fighting the mud menace to his success and happiness."

If the road must be carried over a stream, a bridge will be needed, and there is nothing mysterious about a short bridge. The great trouble with most of the defective bridges has not been in the girders and beams but in the abutments. A bridge built on sand is even

less secure than the house built on sand which has come down to us as typical of useless structures. In the construction of the abutments of little road bridges provision must be made for secure foundations down below any danger of undermining by floods, and the freshets of the coming spring will show whether or not this rule has been observed in their construction.

All these things are noted here because the spring conditions will show before long to the intelligent farmer where road conditions can be bettered at little expense. He can read the lesson easily, if he has a little help at the start. Fortunately, he can obtain that help by the use of two postal cards. In most states, the State Highway Department has prepared bulletins explaining the essentials of earth road construction and maintenance and these bulletins will be sent to any farmer upon application. One postal card will secure them. The Office of Public Roads and rural engineering at Washington also has pamphlets on these subjects for free distribution. Another postal card addressed to Logan Waller Page, director of that office, at Washington, will secure them. Two postal cards, a couple of evenings of reading, intelligent observation of the lanes of mud which will soon be seen in most parts of the country, and then intelligent, cooperative action will accomplish wonders. All that is needed to start the reform is a realization that the annual mud-bound conditions are largely avoidable by inexpensive, intelligently directed work.

#### 500 Sacks of Road Literature.

Road data from 20,000 postmasters of cities and towns located along the 100,000-mile national highway route project by the National Highway Association, is being gathered to aid in the association's campaign to obtain a system of Federal built roads.

To do this fifty tons of mail, filling 500 mail sacks, have been mailed out from the association's headquarters. It order to obtain accurate data, it was necessary to place the most modern and best-drawn maps in the hands of the postmasters.

Supplementing this effort to obtain accurate and detailed information regarding road conditions, the association has circulated maps and information in all to 160,000 persons. Publishing companies, banks, school teachers, clubs and other organizations interested in good roads, the Boy Scouts and Camp Fire Girls have been enlisted in this nation-wide effort to gather exhaustive road data.

In all 1,870,000 pieces of printed matter were distributed, of which over 1,000,000 were maps printed in either two or four colors. Some extent of the magnitude of this undertaking may be gained from the fact that there were 3,475,000 impressions taken to prepare these maps.

This work is in addition to the road photograph contest which the association has instituted and which is designed to produce a pictorial exhibit on road conditions in every section of the country. For three years the National Highways Association has now been engaged in surveys and tours of highways, employing the best expert engineering skill. Its projected highway routes from ocean to ocean and from Canada to Mexico, represent the product of these three years of labor.

When its detail road data is gathered, compiled, and added to the information obtained in these tours and surveys, and its photographic exhibit is perfected, it is expected that the association will have established in the National Capital the most complete "Road Mu-

seum" ever known in this country. It is the association's aim to gather every scrap of road information which can possibly be obtained, its slogan being that roadmaking and road-mapping is a science which requires exhaustive study and complete knowledge of the subject and country.

If it succeeds in its effort to have a National Highway Commission created by act of Congress to study the road problem from a national viewpoint and to guide and control the work of the Federal government in road building all of this information will be placed at the disposal of the commission.

#### Endorse Houston-St. Louis Road.

At a committee meeting at Rosenberg, Texas, resolutions favoring the St. Louis Houston Highway were unanimously passed, and the various good roads organizations in this section were asked to co-operate in the movement, it was announced by W. J. Meininger.

The highway is the one first projected by C. U. McDowell, president of the Lufkin-Livingston-Houston Highway, and which has since been organized under his general direction. It will be the first cross-state road, and it has been endorsed by Texas officials and a large number of commercial organizations all over the state who pledged their support, financial and otherwise.

The United States Government is just completing the expenditure of \$150,000 in the construction of scenic highways around Hot Springs, Ark.

Districts Oseola county, Fla., have voted \$250,000 for building roads and bridges.

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### Good Roads and Business.

That good roads are an economic necessity essential to all phases of our commercial and social intercourse and development, and their favorable influence upon the motor truck and motor car industries will follow as a natural sequence, was the burden of a genuinely interesting and instructive talk given recently by S. M. Williams to the members of the Motor Truck Association of Philadelphia.

As sales manager for the Garford Motor Truck Company of Lima Ohio, Williams has made field investigations and recognizes the great utility of motor trucks for rural use.

His research work also has developed the fact that the lack of good roads is the barrier which must first be removed before farmers can operate motor-driven vehicles to advantage.

Appreciating the necessity in a great movement like this for some one individual or organization with adequate conception of the goal to be attained and the initiative and ability to carry on the work, Williams pointed out to his audience that no more powerful influence for the good roads movement could be obtained than the combined efforts of the motor truck and motor car manufacturers, supported by their vast army of distributors and dealers.

Like selling any commodity with which people are unfamiliar, the success of the good roads movement depends upon educating the public as to its many great advantages and convincing them how they, individually, will be benefitted. He continued:

Farming is a business, and, like any other business man, the farmer must consider the important problem of transportation. Unfortunately, farmers are forced to move their crops when the roads will permit.

Good roads not only enable the farmer to take advantage of favorable conditions in disposing of his crops but reduce the cost of hauling at least two-thirds, according to competent authorities.

They also have a direct bearing upon the cost of living, which is a most important consideration for the consumer.

We frequently hear of the low cost of living in Europe under normal conditions, and when we consider that our average cost of hauling per ton mile is 25 cents, compared with 8 to 12 cents in those countries, we realize that we are paying a heavy tribute to bad roads.

A reduction in the cost of transportation means lowering the market price.

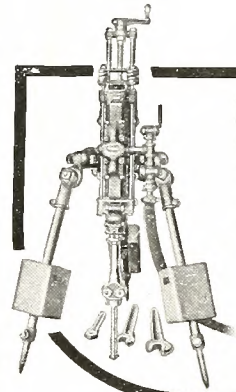
Also the supply of farm products, which generally determines their market price, depends upon the condition of the country roads. A shortage sends the prices soaring and the consumer must dig deep into his pocket to make the purchase.

That land values are increased by road improvement is proven by investigations made by the United States Office of Public Roads. Many examples are cited where an outlay of from \$1 to \$4 per acre enhanced land values from \$10 to \$50 per acre.

It is claimed that New York State's system of improved and connected highways has been one of its greatest assets in the last years, for in 1914 these roads invited more than 250,000 non-resident tourists, who spent millions of dollars within its borders.

Mason county, Ky., votes June 24 on a bond issue of \$200,000 for good roads.

Manatee county, Fla., proposes to spend \$40,000 in the construction of highway bridges.

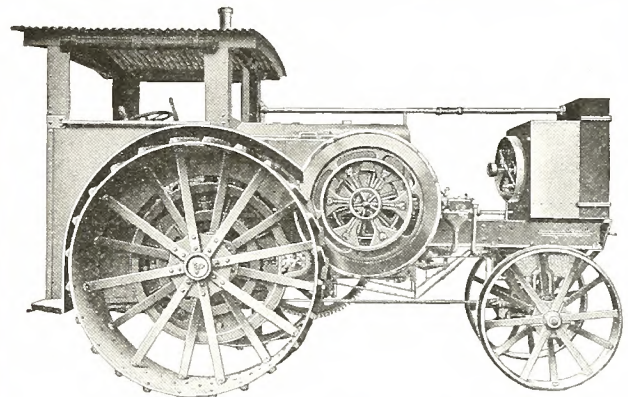


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Every dollar you cut the cost of road grading is a dollar added to your net profit. We can put you in touch with one man who says he cut the cost of road grading in Louisiana from \$26 per mile with mule power to \$4.50 per mile with Mogul kerosene tractor power. His figures are in the official records of his parish.

That is probably an extreme case, but the fact that so large a saving as this could be made, is interesting. It suggests that possibly your costs are higher than they need be. Perhaps a little investigation would pay. Would you like to see some of the figures we have collected—some of the savings we have helped other contractors and road builders to make by changing over to Mogul or Titan kerosene tractor power? They'll cost you nothing but a two cent stamp and a little time. Write for them.

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### Cooperation is Much Needed.

Bad roads in Ohio annually are responsible for an excess transportation cost of \$8,000,000 to \$10,000,000, says George N. Rudisill, director of the Ohio Good Roads Association. The total tonnage transported in Ohio by rail and water is 28,000,000, he pointed out. The wagon tonnage was fixed at 18,000,000 tons. Commercial bodies who spend so much time seeking readjustments of traffic charges by railways would do well to give thought and time to the excessive cost of wagon traffic, due to bad conditions of roads, he declared.

Rudisill said in part:

"The individual and organized forces of rural communities are partly to blame for the lack of co-operation with forces of the cities. While there are a number of counties in which the efforts of rural citizens, county officials, county agents, commercial organizations and other bodies are closely co-ordinated, in many communities, there is an indifference between these forces, even bordering on conflict and antagonism. It is the duty of the people of the rural districts not only to seek but demand the help and counsel of the people of the cities. The thought of the business interests is needed to aid in the movement to turn the mighty life current that has been moving from the farm to the cities, sweeping before it thousands of people each year.

"It is sad to relate that most of our cities, through their commercial bodies, are bending every effort in the fierce struggle for more factories and are giving no thought to the development of the surrounding country. To better rural conditions, to increase agricultural efficiency is to increase agricultural wealth, which in turn accrues alike to the advantage of the farmer and the business man. Agriculture is the industry on which our very existence depends.

"It is believed that after the war millions of people of the exhausted nations will come to this country of peace and plenty, and we are admonished by our president to put forth every effort and cultivate every acre of land possible in order to meet the great demands that must be made upon us. In this connection I might explain that of the 24,000,000 acres of tillable land in Ohio but 19,000,000 are cultivated.

"Cooperation between country man and city man is required as never before. Cooperation is needed between all agencies, with the nation setting the pace. Because of the provision giving to Congress power to establish post roads, upon the federal government rests the constitutional duty to aid in building roadways. Instead of appropriating funds with which to build roads to make rural delivery more efficient and economical, threats are sent out to rural communities that if they do not improve their roads, delivery service will be discontinued."

The Dallas Club, a woman's civic organization of Greenville, Texas, has begun the work of beautifying the highways in that county.

About a thousand delegates were present at the meeting of the Arkansas Good Roads Association in Little Rock last month.

Boyd county, Ky., has voted a half million dollars for road construction.

Representative Linthicum, of Maryland, has introduced a bill in Congress asking for \$250,000 for the purpose of building a road from Washington Annapolis. Maryland will furnish the other quarter million needed.

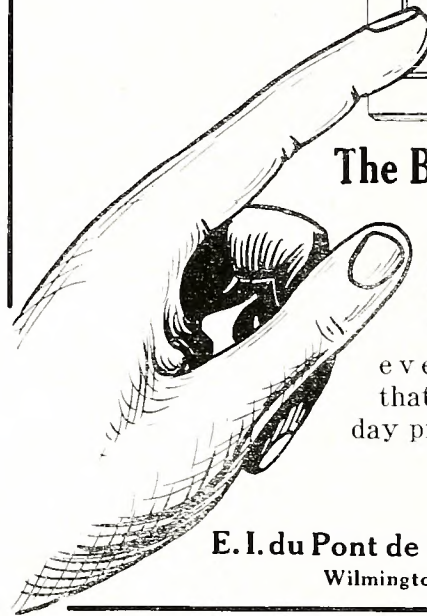
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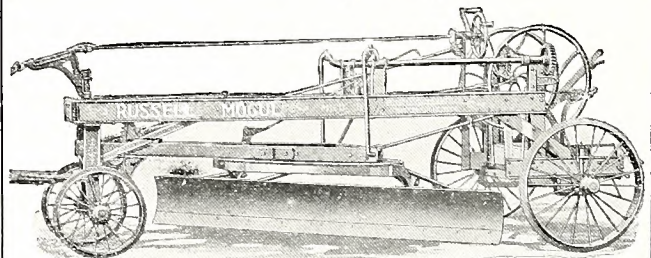
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# SOUTHERN GOOD ROADS

Published Monthly  
By Southern Good Roads Publishing Co.

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second class matter

## North Carolina Good Roads Convention To be Held at Wrightsville Beach Wilmington, June 21 to 25

THE North Carolina Good Roads Convention will be held at Wrightsville Beach, Wilmington, June 21st to 23rd inclusive, and the plans are to make this the biggest road convention ever held in the state and possibly in the South. Cooperating with the Good Roads Association in advertising this convention are the county commissioners of New Hanover county, Wilmington Chamber of Commerce, Wilmington Rotary Club, North Carolina Moving Picture Association, Wilmington business men, etc.

### Special Railroad Rates.

The railroads of the state are also cooperating to make this convention one of unprecedented success. They are offering rates of 3 cents per mile for round trip, plus thirty-five cents, these rates to begin June 19th and to continue in force through the 26th. Where a sufficient number are going from a locality, arrangements can most likely be made with the Traffic Passenger Agents for special trains, Pullmans, etc. The railroads are very generous in their cooperation and are assisting in the advertisement of this convention.

### Cooperation of the Press.

The North Carolina Good Roads Association has always received the most generous support of the North Carolina Press. In fact, we believe that the newspapers of North Carolina as a whole are as progressive as any to be found in the country; and always ready to promote the best interests of the state.

### Subjects For Discussion at Convention.

Some of the subjects which will be taken up at the convention are as follows:

**Road Maintenance**—Special emphasis will be given to the question of maintenance, as it is one of the most vital questions in our road work at the present time. There will be a complete outline of the work of the patrol system as developed under the supervision of Mr. D. H. Winslow of the U. S. Office of Public Roads and Rural Engineering in his work on the National Highway. Mr. Winslow's talk will be supplemented by experiences from other engineers, commissioners, etc., and a very free discussion invited of this very important subject.

Very closely allied to the question of maintenance is

the subject of broad tires which will also be discussed.

**Sign Boards**—Up to the present time little attention has been paid by the county road officials of North Carolina to the question of sign boards, although there is a law in our statute books which reads as follows:

"Overseers shall cause to be set up, at the forks of their respective roads, a post or posts, with arms pointing the ways of each road, with plain and durable directions to the most public places to which they lead, and with the number of miles from that place as near as can be computed; and every overseer who shall, for ten days after notice of his appointment, neglect to do so and to keep the same in repair, shall forfeit and pay for every such neglect ten dollars."

We want to bring this subject to the attention of our officials, and make them realize the importance of sign boards to the state as a whole, to the various sections of the state, and particularly to tourists coming into the State.

**Federal Aid**—The recent action of the United States Senate in passing an act appropriating \$75,000,000 to be spent in road construction and maintenance throughout the country over a period of five years brings about a new phase in road building in this state. The House of Representatives had already passed a bill for Federal Aid in road building, and this action of the Senate makes it practically certain that a bill carrying a large sum for road construction will be ratified by this Congress. All of this Federal money will be spent under the direct supervision of the State Highway Commission and on a cooperative basis. The method of expenditure of this money will be discussed at the convention not only by a representative of the United States Office of Public Roads and Rural Engineering, but by the State Highway Engineer and others.

**Automobile Tax**—North Carolina is levying a tax on automobiles which is called a license fee. All that is received by the State above the actual cost of licensing the automobiles is practically a tax on the automobile for the privilege of using the public roads of North Carolina. At the present time the automobile is the only vehicle using the public roads that has to pay such a privilege tax. Have the automobilists taken the interest they should in finding out what use is being made of the tax they are paying? Should not this fund be

used for the maintenance of the public roads of North Carolina? Are you interested in this question? A free discussion of these questions will be taken up at the Good Roads Convention at Wilmington. The automobilists of North Carolina should be in attendance at the convention to take part in these discussions.

#### **Work of States Prisoners on Public Roads.**

There has been considerable agitation for the past several years in regard to the work of the state's prisoners on public roads, there being an ever growing sentiment to the effect that all of the state's prisoners should be used for this purpose. In fact, a number of organizations in North Carolina have recently gone on record as favoring such action on the part of the legislature. Within the past four years the legislatures have passed special acts appropriating a certain number of prisoners to work on special roads, as the Hickory Nut Gap Road in Rutherford and Henderson counties, and the Central Highway in Madison county and in McDowell county. Now that the State Highway Commission has been established, these prisoners could be worked to great advantage on the through highways of the state, not only in construction work, but in maintenance. It is believed that such use of the prisoners will lead to the training of them in certain types of work so that they can be employed by counties to continue this work after their sentence expires.

#### **County Prisoners.**

The question of the work of county prisoners will be thoroughly discussed, particularly in regard to how their work can be made more efficient in road construction. The discussion will also deal with the care of the prisoners, sanitation of prison camps, health of the prisoners, honor camps, trustees, etc.

#### **North Carolina's System of Highways.**

It is the purpose of the State Highway Commission, working in cooperation with county road officials and the Federal Government, to secure for the state a system of highways connecting county with county, and also connecting with good roads from other states. A number of these highways which are being constructed will be discussed and opportunity offered to delegates from along these highways to make brief talks in regard to the progress of the work in their particular sections. These highways are:

Central Highway, Wilmington-Goldsboro Highway, Wilmington-Charlotte Highway, Charlotte-Asheville Highway (Hickory Nut Gap), Wilmington-Fayetteville Highway, Winston-Salem-Bristol, Tenn. (Blowing Rock) Highway, which includes the U. S. Government Post Road, connecting Winston-Salem with Statesville. Crest of the Blue Ridge Highway, National Highway, Atlantic Highway, Capital Highway, Triangular Highway, Charlotte-Pinehurst Highway, Asheville-Murphy Scenic Highway.

Among the speakers who will discuss the various subjects outlined above the following are expected:

Hon. E. L. Daughtridge, Lieutenant Governor of North Carolina.

J. E. Pennybacker, Chief of Division of Road Economics, U. S. Office of Public Roads and Rural Engineering.

W. S. Fallis, State Highway Engineer.

Dr. W. S. Rankin, Secretary of the State Board of Health.

Mr. W. S. Shirley, State Road Engineer of Maryland, and President of the American Association of State Highway Officials.

Mr. Charles Henry Davis, President, National Highways Association.

Mr. O. L. Evans, President, Virginia Road Builders Association.

Mr. C. A. Kenyon, Director of the American Highway Association.

Mr. A. G. Batchelder, Chairman, Executive Committee of American Automobile Association.

Dr. C. P. Ambler of the Asheville and Buncombe County Good Roads Association.

Mr. Leonard Tufts, President, North Carolina Agricultural Society.

Mr. Joseph Hyde Pratt, State Geologist.

Mr. D. Tucker Brown, Director, North Carolina Good Roads Association.

Mr. G. Herbert Smith, of Aeme, N. C.

Dr. Charles T. Nesbit, Superintendent of Health of Wilmington and New Hanover county.

Mrs. Thomas W. Lingle, President, North Carolina Federation of Women's Clubs.

#### **Appointment of Delegates.**

Special delegates are being appointed by boards of county commissioners, road commissioners, mayors of cities, chambers of commerce, boards of trade, Rotary Clubs, T. P. A. Posts, motor clubs, women's clubs, etc. An invitation, however, is extended to all the citizens of North Carolina who are interested in the promotion of good roads and in the promotion of the public weal to attend this convention.

#### **Prizes Offered.**

The North Carolina Good Roads Association is offering certain prizes for attendance, exhibits, etc., as follows:

1. First and second awards will be made to the counties which have the largest representation at the Wilmington Convention. The award will be based on the following ratio of the number of people attending to the distance travelled, the distance to be reckoned by railroad mileage from the county seat of the county from which the delegate comes. In this plan, those attending from the city of Wilmington will not be considered. 125 from a county whose county seat is a distance of 25 miles or less from Wilmington will be rated the same as 100 delegates coming from a distance of 26 to 60 miles from Wilmington:

or 75 delegates coming from a distance of 61 to 90 miles from Wilmington

or 50 delegates coming from a distance of 91 to 150 miles from Wilmington

or 25 delegates coming from a distance of 151 to 200 miles from Wilmington

or 15 delegates coming from a distance of 201 to 250 miles from Wilmington

or 10 delegates coming from a distance of 251 to 350 miles from Wilmington

or 5 delegates coming from a distance of over 350 miles from Wilmington.

2. An award will also be made to the city which has the largest representation at the Convention, the award to be based on the ratio of the number attending to the distance travelled, this to be reckoned similarly as for counties under No. 1. This award will also be based on the ratio to the number attending to the total population of the city as follows:

100 delegates coming from a city of 40,000 population and over will be rated the same as

75 delegates coming from a city with a population of 25,000 and less than 40,000

or 60 delegates coming from a city with a population of 25,000 and less than 30,000  
 or 50 delegates coming from a city with a population of 20,000 and less than 25,000  
 or 40 delegates coming from a city with a population of 15,000 and less than 20,000  
 or 35 delegates coming from a city with a population of 10,000 and less than 15,000  
 or 30 delegates coming from a city with a population of 5,000 and less than 10,000  
 or 25 delegates coming from a city with a population of 2,500 and less than 5,000  
 or 20 delegates coming from a city with a population of 1,500 and less than 2,500  
 or 15 delegates coming from a city with a population of 1,000 and less than 1,500  
 or 10 delegates coming from a city with a population of less than 1,000.

3. Two awards are offered to the organizations sending the largest delegation of their membership to the convention. In making the award, consideration will be given to the distance travelled in the ratio as given under the first award. Consideration will also be given to the total membership of the organization and 100 delegates from an organization whose total membership is 500 or over will be rated the same as:

76 delegates from an organization whose total membership is 400 and less than 500  
 or 50 delegates from an organization whose total membership is 300 and less than 400  
 or 25 delegates from an organization whose total membership is 200 and less than 300  
 or 20 delegates from an organization whose total membership is 100 and less than 200

or 15 delegates from an organization whose total membership is 50 and less than 100  
 or 10 delegates from an organization whose total membership is 25 and less than 50.

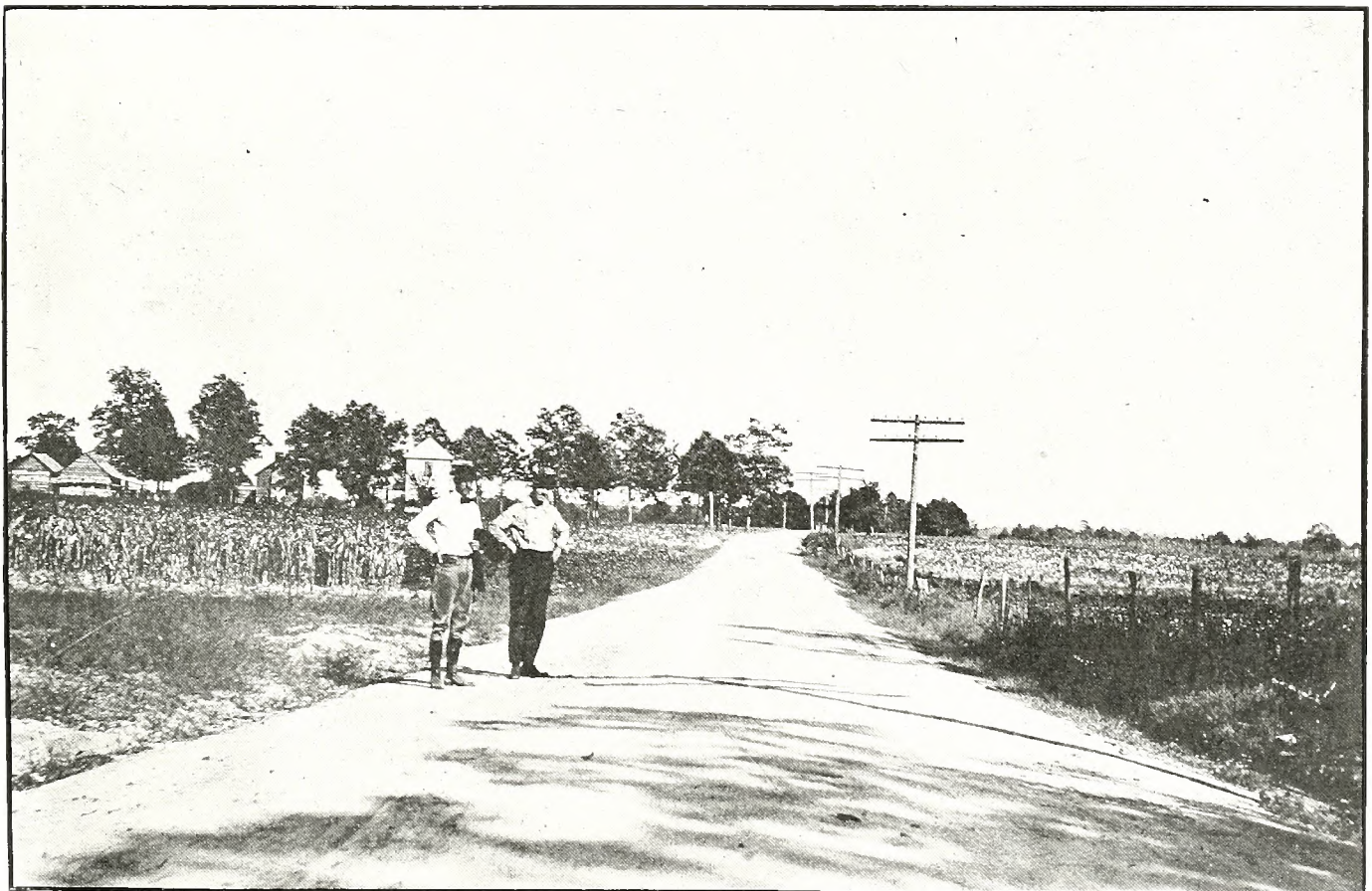
Any duly organized association or club can compete, such as Boards of Trade, Chambers of Commerce, County Good Roads Associations, Automobile Clubs, Rotary Clubs, Women's Clubs, T. P. A. Posts, County Farmer's Unions, etc.

4. An award is also offered to the county making the best exhibit illustrating its road work by means of photographs, maps, drawings, samples of road materials, etc. The award will be made according to the following points:

County road map .....	20 points
Photographs of improved roads.....	10 points
Photos showing construction work.....	5 points
Photos of roads before and after improvements	5 points
Photos of county bridges .....	5 points
Chart illustrating method of handling road funds .....	10 points
Chart showing cost of improved road, bond issues, special taxes, etc.....	10 points
Cross-section of roads .....	5 points
Samples of road materials used.....	15 points
Installation of exhibit.....	15 points

Total.....100 points

5. An award will also be made for the best road photograph. Photographs that are handled in competition for this award must be separate from the county exhibits. Any individual, whether a member of the



Fine Stretch of Top Soil Road in Warren County, N. C. Sam D. Scott, Engineer.

Good Roads Association, or not, can compete for the exhibit.

As every person in North Carolina is invited to attend the North Carolina Good Roads Convention, in determining the representation of a county, city or organization at the Convention, it is not necessary that the individual shall be a specially appointed delegate. All are welcome to this convention and the only requisite for the competition is that they shall register.

#### **Headquarters of Convention.**

The Seashore Hotel at Wrightsville Beach is the headquarters of the Convention.

#### **Demonstrations for Convention.**

Arrangements have been made with the Barrett Company for thirty thousand gallons of Tarvia to go with their one thousand gallon pressure auto distributor for spreading same. This will be used to demonstrate the method of maintaining water-bound macadam roads by spreading Tarvia on a half mile stretch and covering it over with half inch granite chips. The delegates will be taken out in automobiles to inspect the roads of New Hanover County and will see this demonstration while making the tour.

#### **Entertainments.**

All entertainments are free to the delegates. There will be music, amusing stunts by the Rotary Club, athletic stunts by the boys of the Y. M. C. A., fishing parties, yacht races, bathing, etc. Fishing trips will be arranged so that those desiring can get back by ten o'clock for the morning session. Everybody is invited to come and have a good time and help in boosting for GOOD ROADS IN NORTH CAROLINA.

#### **146 Road Rollers Ordered by One Customer.**

One of the most remarkable events in the road roller manufacturing business has just occurred in the purchase of 146 road rollers by the Russian government from the Austin Mfg. Company, Chicago. This order is without doubt, the largest ever placed in the history of road rollers, either in this country or any other country.

The heading for this article is perhaps modest in that it only refers to the orders placed in April, 1916. As a matter of fact, the Russian government have owned and operated about 50 Austin rollers for a number of years. It can be attributed to the latter fact that this recent magnificent order has been placed with the same concern. The machines are ordered in three different sizes, 8-ton, 10-ton and 12-ton; they are equipped to operate on Russian kerosene oil, the product of the vast oil fields located in southern Russia.

The history of the Austin motor roller has been spectacular. Nine years ago they put their first machine on the market and probably no piece of machinery connected with engineering construction work has ever created so much excitement amongst competing manufacturers, or attracted so much attention from the road building public using road rollers.

The Austin roller was the first motor driven machine placed on the market in the United States, and it was only natural for it to create tremendous opposition from the old established steam roller manufacturers, who had believed themselves securely entrenched in a market of their own. The opposition to the machine however, was confined to those interests. It is to the credit of the American road building public that the Austin motor roller got a splendid reception from the very start. The exceptional advantages and improve-

ments it offered were quickly appreciated, and the machines were adopted very rapidly by all sections of the country. In fact, for the first few years after its introduction, the purchases were limited only by the capacity of the Austin shops to build the machines. These shops have been added to four times in the nine years until they are now undoubtedly the largest and most perfectly equipped in the world devoted to road rollers and road making machinery.

If there ever was a foundation to the doubts expressed about the practicability of the Austin motor roller when it first appeared on the market, that foundation has been proved false and been swept away by the enormous success which the roller has met with in every part of the world, and this impressive order for such a large number of machines, one that all American manufacturers must be proud of.

#### **Cabell County Given Credit.**

Good Roads is glad to give publication to the following letter:

"Gentlemen:

I notice in your issue of May 1916, an article in regards to bond issues in West Virginia. You have stated that Cabell county has issued \$300,000 in bonds. I wish to inform you that we have have issued \$900,000, about two-thirds of this has been spent or is under construction at the present time, the remainder will be used this summer. When this bond issue is exhausted, all of the main highways through Cabell county from border to border will be paved sixteen feet wide with vitrified bricks on a five inch concrete base with concrete curbs. The completion of these roads will cut down the cost of the maintenance of roads to such an extent that we will be able to build from two to three miles of paved roads per year with the original fund that was used in attempting to maintain and build the few dirt roads that were originally used. The effect of the paved roads here is spreading to the surrounding counties. Wayne county, the adjoining county to Cabell, is trying to get through a \$1,000,000,000 bond issue. When the present roads that are under construction are completed, and with the paved roads here in Huntington, we will have about 160 miles of pavement in Cabell county.

"Wishing you the best success with your magazine, I beg to remain,

W. H. KINCAID."

#### **Save on The Bridges.**

Saving the waste of money on the highway bridges is just as important as saving it in building and maintaining roads, and wherever roads are placed under trained, energetic engineers, bridges received careful supervision. It is sometimes surprising to the non-technical taxpayer to observe where these economies are possible. In Nova Scotia, for instance, where timber is relatively cheap compared with its cost in many parts of the United States, it has been found possible to save a considerable sum annually by flooring bridges carrying heavy travel with wooden blocks on creosoted planks and beams. The cost of such construction is much in excess of that of the ordinary plank floor, yet five year's experience shows that the longer life of the block floor makes it materially less expensive in the end.

Dallas county, Texas, built \$285,000 worth of macadam roads during 1915.

# Miami, the Highways Terminus

By GUY W. LIVINGSTON

**M**IAAMI is fortunate in having been made the Terminus of more great highways than any other city in the United States. When you take into consideration the fact that we are a city of 21,000 people and only 20 years old, it reflects quite plainly that we must necessarily have something to justify these honors.

The best known of these highways is the "Dixie" and extends from Mackinaw City, Mich., to Miami, a distance of 1930 miles, via the Western Division and 2169 miles via the Eastern Division. When the first inspection trip of the officials of the Dixie Highway Association arrived in Miami on October 25, 1915, they were met by 1,000 automobiles and escorted into the city from the county line with great enthusiasm.

That portion of the Dixie Highway extending from Jacksonville to Miami, a distance of 366 miles, serves as a part of four other national highways which show Miami as their Southern terminus, viz:

The Atlantic Highway from Calais, Maine, to Miami.

The Great Lakes-Atlantic Highway from Cleveland to Miami.

The Jefferson Davis Memorial Highway from Los

Aneles to Miami, via El Paso, Tex., New Orleans, La., and Jacksonville, Fla., the Old Spanish Trail forming the portion from New Orleans eastward.

Dade county has over 400 miles of fine rock roads and about half of this amount is now oiled, offering a smooth highway for motor car travel and for commercial use. During the heavy shipping season when citrus fruits and vegetables go north by the train load every day, it is no uncommon sight to see a procession of motor trucks hauling packages of fruits and vegetables to the numerous sidings or to the docks of the Steamboat line; the county commissioners and city officials being very much alive to the fact that goods are a formidable asset.

Miami is fortunate in having an abundance of rock as the city sits on a foundation of rock known as Oolitic Limestone. It crops out to surface in nearly every square mile of the county, is easily worked and often on a stretch of road requiring considerable fill to establish an even grade, rock is used almost to the exclusion of dirt, being cheaper to obtain and far more lasting.

The fine rock which serves for the top dressing is



Dixie Highway at Entrance to Miami, Florida.

rolled as smooth as possible and then the oil is spread from a tank wagon, the soft rock absorbing a goodly portion. Over this, fine clean sand is evenly distributed and the road is ready for use. This oiling and sanding process is repeated in a few weeks and in a month or so the oil has absorbed the sand entirely and the road takes on the appearance of a city asphalt street, never dusty and restful to the eye.

#### **Tamiami Trail is Now Assured.**

The Tamiami Trail from Miami on the East Coast to Tampa on the West Coast of the state is an assured fact. The contract has just been let for the Dade county por-



How Miles and Miles of the Dixie Highway Have Been Planted With Australian Pine Trees, Affording Shade in About 4 or 5 Years—5th Street Extension, Miami, Fla.

tion of the road and the contractors have given bond to complete their work in eighteen months, stating they expect to finish in one year.

It is 45 miles from the Court House in Miami to the Lee county line and of this amount, 8 miles are now in use as 20th street is the starting point from Miami. When the road is finished there will be 32 miles straightway, then a slight curve to the northwest and thence a straight road of 13 miles to where we meet with the road to be built by Lee county on to Mareo and up the West Coast to Tampa.

The contractor will dredge out the muck and marl a width of 24 feet or more to rock which lies underneath at a depth of from 2 to 6 feet or more. The rock will

then be lifted and such as is used for top dressing will be crushed as wanted. When the oiling has been completed and the planting of trees and shrubs shall have been accomplished, no finer roadway will be found in the entire state.

The canal which will be dredged to obtain the road material will drain thousands of acres of land, and settlements will spring up as if by magic.

Within a period of three years almost nine millions of dollars have been voted in the state of Florida for good roads and bond issues totaling three and a half millions are contemplated and will no doubt go through.

#### **Much Interest in Earth Roads.**

All through the Central States there seems to be at present an unexpected interest in earth roads, and there is a widespread desire to have an authoritative opinion on the field for which such roads are adapted. It is a subject on which many experienced road engineers are not willing to make any statements for fear of being misunderstood or misquoted, but the road engineer of the Illinois State Highway Department has recently made some comments that answer a part of this oft-repeated question as follows: "The earth road cannot, by any system of maintenance, be kept up throughout the entire year to the usual standard of the other types. The use of the road in a wet and softened condition is what causes the trouble. Under the conditions where the earth road is a suitable type, its total cost for construction and maintenance is less than that of any other type. In dry weather and when it is not too dusty, the properly constructed and maintained earth road is by far more pleasant and more satisfactory to travel upon than any other road. With neglected maintenance, however, no other type of road can go to pieces and become impassable so quickly as an earth road. Nor, on the other hand, can any other type be brought to a satisfactory condition for travel so quickly and so cheaply after having been impassable. From these peculiar features, it will be noted that practically the entire problem with earth roads is their proper drainage and systematic maintenance. The opportunity for bettering our road conditions by properly improving the earth roads is almost beyond our imagination."

#### **Fix Bad Virginia Road.**

The portion of the Richmond-Washington highway known as the Chopawamsic Swamp, and further known from Quebec to Miami as the worst piece of roadway between the North and South, is to be regenerated if plans now being formulated by officials of the A. A. A. District of Columbia Club are consummated.

With another touring season at hand, and the club's touring bureau in daily receipt of evidence showing that the thousands of motor cars which annually ply between the North and the South have no intention of visiting the National Capital, because of the abominable condition of the few miles of road in Prince Williams County, Va., club officials have decided that the work of getting this piece of highway repaired should be no longer delayed.

Judge Martin Knapp, president of the club's advisory board, has appointed a committee composed of Dr. C. Hart Merriam, J. Harry Cunningham and Rev. John Van Schaick, Jr., to supervise the raising of funds with which to repair the notoriously bad stretch, and it has been tentatively proposed that an appeal be made to both commercial and motoring Washington on two



Tropical Driveway Lined With Cocoanut Palms—Florida.

points of favor—one, that a great good to the National Capital's commercial interests will result from the road's repair, and that the average motorist should gladly subscribe \$2, \$5 or \$10 to a plan that would give him in new touring place; also that it is far better to give \$2 or \$3 now than some day become mired in the swamp and obliged to pay \$10 or \$15 for succor, aside from perhaps greatly damaging his car.

Tentative arrangements also propose conspicuously tagging each car, the owner of which has contributed to the fund in any sum, and asking cooperation of the Washington newspapers to the extent of daily publishing the progress of the fund.

With the repair of the six and one-half miles in Prince William county, one of the finest north-and-south highways in the country will have been completed, with Washington as the chief point of interest along the route.

According to State Highway Commissioner Coleman, of Virginia, approximately \$9,000 is needed. Richmond, which had already contributed about \$200,000 to the original project for a highway between the two capitals, is now successfully conducting a campaign to raise \$5,000 for the Prince William bog. This leaves \$4,000 to be raised in Washington, which, according to statistics on hand at A. A. A. headquarters, would benefit to a far greater degree than any town or city on the route from its northernmost to its southernmost point.

#### Curve Danger to Autos.

Curves on roads as ordinarily built have a special element of danger when used by automobiles. The higher elevation of the center of the road as ordinarily constructed has a tendency to induce drivers to pass on the inside of the curve, whether they belong there or on the outside. Accordingly in a few states it is now the practice to give the cross-section of the road on curves a uniform slope upward from the inside of the curve to the outside, so that driving around the curve is equally agreeable at any part of the cross-section. This is called "banking" a curve by engineers. In Rhode Island where all curves are banked on new and or reconstructed state roads, the amount of slope given to the road in such a situation depends not only on the sharpness of the curve but also on the grade of the road. If the grade is steep the crosswise inclination is greater than if the curve occurs on a level road. This practice is exactly the same as that of railway engineers, who always elevate the outer rails on curved tracks.

The week of August 7-12 has been set aside by Jackson Highway officials as "Good Roads Week" along the entire route of the highway.

The Meridian Board of Trade is now preparing a booklet that will show the principal good roads of Mississippi.

## New Idea In Truck Building

The performance of the White Good Roads Truck has been heralded through every county in the south but St. Louis and Lexington, Kentucky, are the first municipalities in this section to place orders for the delivery of the new White combination road maintenance and construction truck. This new type has facilities for sprinkling and flushing streets, oiling roads or spreading hot asphaltic oils. When the truck is not needed for road work the iron tank which holds the liquids can be easily removed and the truck used with an ordinary body for general haulage purposes.

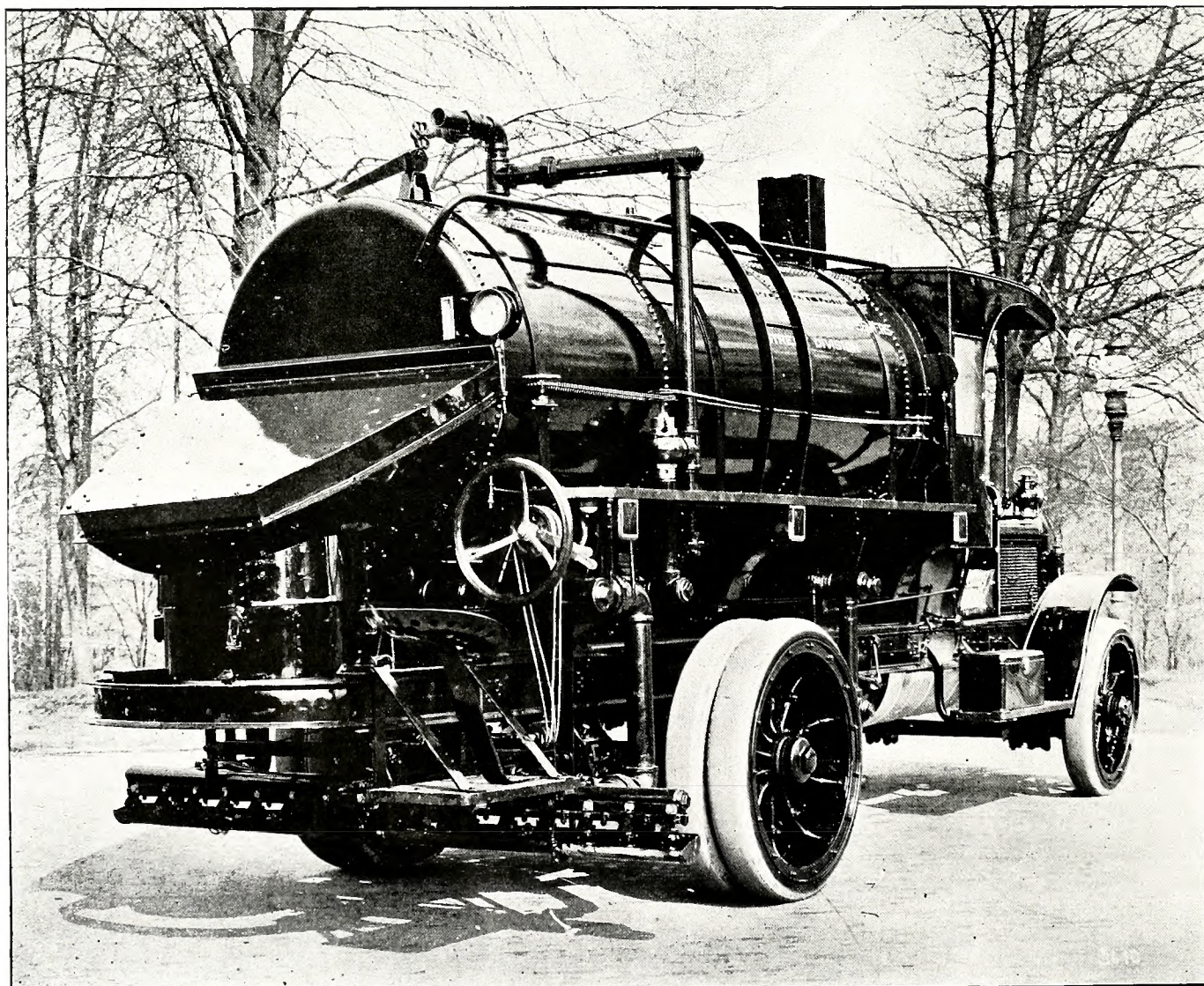
This truck will save a municipality thousands of dollars by eliminating the need for individual pieces of road machinery which can be used only during certain seasons and for special work. It performs all the duties of the special machinery with greater efficiency, and at a great saving in time and labor expense. It is available in two sizes, 3 ton chassis with 800 gallon tank of 5-ton chassis with 1,000 gallon tank. Both have 45 H. P. motors. The 1,000 gallon tank is 48 inches in diameter and 10 feet 6 inches in length. The tanks are made of heavy steel, hot riveted and calked inside and out.

The truck has many distinct advantages, two of the chief features being the rotary displacement pump and the new improved heating system. The pump is driv-

en by a lay shaft from the rear of the truck transmission case and may be used to fill the tank with oil or water through an intake pipe at the front. It saves time also in loading the tank direct from a freight car, because the pump has a lift of thirteen feet and consequently the tank need not be on a lower level than the car. The high temperature possible with the new heating eliminates the need for separate heating plants, erected alongside the freight car or by the road.

The heater located in a separate section in the rear of the tank can raise the temperature of a tank full of material at the rate of one degree a minute and maintain 350 degrees steadily. While the material is being heated the pump keeps the oil in constant circulation, carrying it out the top down a pipe at the side and into the bottom of the tank. This agitation overcomes the tendency of the heavier oils to settle on the tank's bottom and become thick or gummy. Heat is delivered uniformly to every one of the boiler flues in the one third lower section of the tank and there is no danger of fire or overflow. Other types heated with flash burners in a false section of the tank frequently overheat the flues nearest the burners, igniting the liquid.

The pump delivers oil to a set of sixteen nozzles in the rear of the truck and spreads it uniformly over a strip of road 8 feet 6 inches wide. If desired, these noz-



White Combination Road and Street Truck, Owned by City of St. Louis.

zles can be moved to the right or left of the center a distance of two feet. The 80 pounds pressure from the pump drives the oil down into the crevices of the road surface, binding it firmly. The nozzles and pump pressure are regulated by a man from a small seat at the right side and the rear of the truck. A double bell system enables the driver of the truck to communicate with the operator on the rear while the truck is in motion.

After the truck has been used for oiling or spreading asphalt it can be quickly cleaned by circulating kerosene through it. The kerosene is stored in a small tank on the left side of the truck. The truck is then ready for sprinkling. In flushing the pump delivers 300 gallons of water per minute covering a strip from 8 to 12 feet, while the sprinkling nozzles cover from 20 to 40 feet.

### A Strange Circumstance.

Fifteen years ago, at the opening of the present century, the steam tractor had reached its fullest development and Steam Tractors had become a common sight in all sections of the country doing the many kinds of work to which a tractor could be adapted.

During the last ten years of the nineteenth century it had taken its place as one of the country's indispensable machines and yet today it has totally disappeared, buried in oblivion and none so poor to do it reverence.

Why? What drove it out of existence so suddenly? The Gas Engine. When the gasoline or kerosene motor had been fully developed and applied to a tractor its complete superiority over the steam tractor was so obvious and was so quickly recognized that the steam tractor simply faded away.

In a recent issue of the Farm Implement News, devoted to the tractor industry, there is given a Tractor Directory in which are listed alphabetically by name one hundred and forty-six tractors. Everyone of them is a gas or motor tractor and there is not a steam tractor in the whole lot. Thus in a few brief years it has been both killed and buried by its successful rival.

Everybody knows this is so. It is so much so that you never even see a steam tractor any more—a belated one sold years ago and still in operation. They have been as completely suppressed as though they had never existed.

There is only one modification to the above sweeping statement and that is as it applies indirectly to the steam roller. A roller is nothing more nor less than a tractor with heavy wheels. The work required of it is exactly similar to that of any other kind of tractor and there is not a single reason for abandoning the steam tractor in favor of the gas tractor that does not apply with equal force to abolishing the steam roller in favor of the motor roller, and yet, strange to say, while you cannot see a steam tractor any place you can see more or less steam rollers which have still survived, and stranger even than that, some people are still buying them.

Ten years ago there was not a motor roller in America. The first one built in this country was the Austin Motor Roller of the Austin-Western Road Machinery Co. Since then its sales, both actual and relative, have increased by leaps and bounds until today a very large percentage of all power rollers made in this country are motor rollers and probably ninety per cent of the motor rollers are Austin rollers.

As an indication of the magnitude to which the Austin Motor Roller business has grown in a few years, the

foreign and domestic sales of this roller alone during the single month of April were nearly two hundred, which is doubtless a larger number than the total sales of all other rollers made in America, both steam and gasoline, during the same period, and yet the strange fact remains, as stated above, that there are still some people so old fashioned and unimpressed by the march of progress that they still buy and use steam rollers. Not many, but some. Odd, isn't it?

Some might suppose that the answer this year would be found in the high price of gasoline, but that is not so as gasoline would have to go very much higher than there is any possibility of it going to make an Austin Motor Roller cost as much for operation as a steam roller even when running on gasoline, but as a matter of fact, the Austin Rollers work equally as well with kerosene, distillate and other low-grade fuels costing but a slight percentage of the price of gasoline, and it is with such cheap fuels that the large majority of them are being used.

It is simply one of those strange circumstances that cannot be explained, why certain people do certain things, and in the absence of any other explanation we will have to let it go at that.

### Predicts Great Advance.

"Another ten years will see national road systems covering every section of the country—the greatest practical step in the direction of preparedness that could be made," comments Dr. H. M. Rowe, the newly elected president of the American Automobile Association, from the Washington headquarters.

"In a decade we will begin to have separate roads for freight traffic and passenger traffic," predicts Dr. Rowe, "and the horse and mule will have practically disappeared. Our present highways will be greatly multiplied and largely increased in width and improved in quality. No other country on the face of the earth can make such good and profitable use of good roads as the United States of America. We will eventually excel in that as we do in many other things. There have been wonderful changes in all matters relating to transportation since the introduction of the motor-car, but there are still greater things to come.

### The Old Jackson Route.

Ninety-nine years ago Andrew Jackson began the construction of a military highway from Nashville, Tenn., to Madisonville, La., which was completed in May, 1820. It was planned by the topographical engineers of the army and built by soldiers. In the final surveys the engineers followed a straight line bearing North 35 degrees East as closely as the topography of the country permitted. The total length of the road is 516 miles and all of it has been in continuous use ever since it was finished. At the present time there is a project to transfer the name of Jackson Highway to another route between these two terminal cities. The advocates of the old route make the statement that the rural white population along it is five times as long as the proposed new route, which is 810 miles longer, good testimony to the value of a well-located highway in bringing people into the country traversed by it.

Montgomery county, Ala., steps into the front of the good roads procession with 430 miles of public roads graveled, out of a total of 650 miles in the county. Her citizens claim the best system of any of the Southern counties.

# Alabama's Fine Good Road System

**A Southern State That is Gaining Wide Renown by  
Consistent Highway Building**

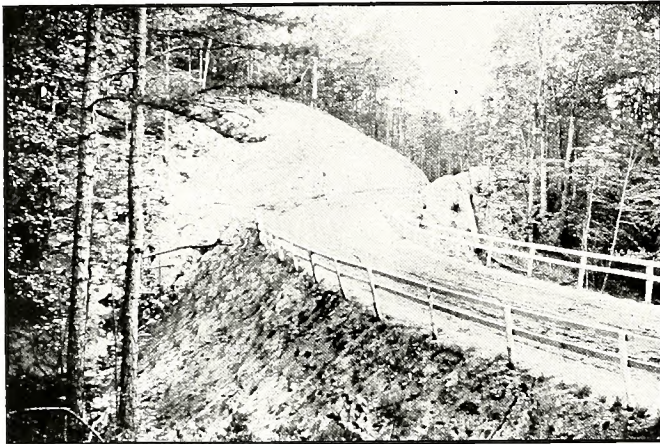
**A**LABAMA'S system of good roads admittedly is the best of any of the southern states and has been more than favorably compared with the best road system in the United States. The advancement in good roads has been notable during the past four or five years, during which period the mileage practically has doubled.

All of the counties, unfortunately, are not keeping the same pace in good road development and building but added impetus has been given during the past two

the mileage had increased to 7,195.19 miles. This percentage of increase was 90.34 per cent.

The greatest per centage in any one year was in 1914, when it showed 14.50 per cent.

Some of the counties of the state declined state aid in building their roads. The counties, of Baldwin, Cherokee, Choctaw, Clarke, Conecuh and Monroe have not received state aid for building either good roads or bridges, according to the annual report of the department. Practically all other counties have accepted this



Good Engineering on Alabama Road.

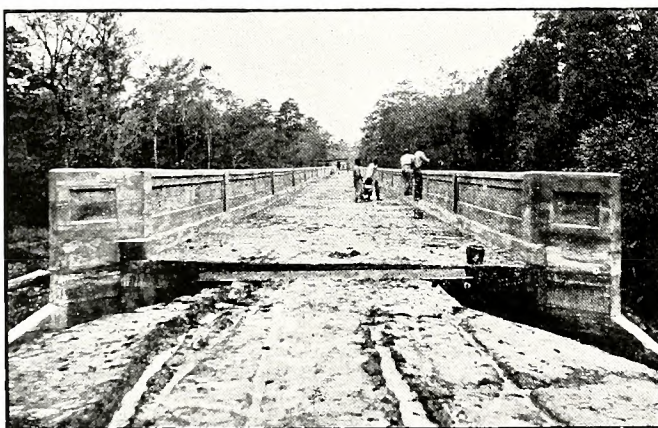


Restful Scene on Fine New Alabama Highway.

years that promises to make the state as a whole generally on a par with the best counties at present. The coming of the automobile is credited with causing much of this splendid development, and thinking farmers and planters have realized finally that it is money saved by

state aid for both purposes, and others it is stated are planning to use state aid money in furthering new road construction.

In 1911 there were thirty-three counties receiving state aid to the amount of \$65,982.95, while in 1914



Reinforced Concrete Bridge Over Conecuh River in Pike County, Ala. Longest Bridge in State. Length 487 ft., 9 in. Built by State Aid.



Graded Road, Randolph County, Alabama.  
Cost per Mile \$1798 08.

having good roads on which to transport their products to the nearest markets.

Five years ago, according to the official report of the state highway engineer's department, there was 3,780 miles of good roads in the state, that is roads of various kinds that had been improved and made of a permanent character.

At the end of last year, embracing a four year period,

there were forty-five counties thus aided to the amount of \$144,978.59.

During the four year period the state gave aid to the sum total of \$437,237.97, while these counties themselves expended during that period the sum of \$495,860.14, making a sum total expended in four years for good roads in Alabama of \$933,098.11.

Besides the upkeep of the good roads already con-

structed, during that period there were added 442 miles of new roads in the various sections of the state.

The state highway commission, in making its last annual report, recommended a substantial increase in the appropriation for the state highway department, and added this comprehensive statement:

#### Growth of Sentiment.

"There has been a steady growth of sentiment in Alabama in favor of building good roads, and keeping them built, about corresponding with the marvelous increase in improved roads in the state in the past four years. With the money which the state was able to appropriate for the maintenance of this department it has been possible to build a few miles of excellent roads in every county in the state (excepting those few which have declined all state aid) and with these as an object



Chert Road, Bibb County, Alabama.

lesson, and in some case as a nucleus, the growth of good roads sentiment and of good roads themselves have been beyond our most sanguine expectations."

Reports from the various counties throughout the state for the year 1915 are slow in being returned to the office of the state highway department. This is accounted for in the fact that so many additional counties have taken up good roads work and the heavy increase of this work in the other counties, thereby making the task of compilation for the various clerks much heavier than heretofore. The reports so far received

embrace forty-seven of the sixty-seven counties, neither Montgomery nor Jefferson counties, two largest in the state, being included.

#### Work in 47 Counties.

Of the forty-seven counties so far reporting, nine did much constructed work on both roads and bridges, while the other thirty-eight confined themselves to new and repair work on good roads solely. These reports show that the sum of \$1,161,138.52 was expended from the state general road fund, while the sum of \$275,083.03 was spent on bridges from the general road or bridge fund, during the year 1915. It is also shown that \$636,915.11 were spent on roads and bridges through bonds or warrants, and that \$334,513 in bonds had been issued during the same period. The issue or warrants for good roads and bridges during 1915 totaled \$964,335.57. These reports show a sum total of \$3,371,985.23 expended for good roads and bridges, or appropriated for such work during the past year.

Of the forty-seven counties reporting the nine that spent money during the year 1915 for good roads and bridges are Butler, Crenshaw, Elmore, Franklin, Madison, Mobile, St. Clair, Sumter and Talladega. During the year a number of the counties authorized the issuance of bonds specifically for good roads and bridges, the most pronounced illustration being the action of Baldwin county. The people of Baldwin county voted to tax themselves heavily for the purpose of constructing one trunk road to insure a permanent route into and out of Mobile county, through a section of the state that is given over to marshes and lowlands that offer some of the greatest engineering problems of any section of the state.

#### Jackson Highway.

Engineers have just completed surveys and estimates of this work, and in their opinion a permanent roadway may be established through this marshy land, and a modern good roads highway constructed that will withstand the ravages of the elements. The greatest problem confronting the engineers, it is stated, was finding a solid foundation upon which to build, and this necessitated considerable heavy piling at certain points. So enthusiastic are the people of Baldwin county, as well as those in the northeastern section of Mobile county, through which the main trunk road will pass, that bids have been advertised for this work, and a determination reached to push its construction.

All parts of the state have become interested in the great Southern highway that is to be formally and officially recognized and designated as the Jackson Highway. This road is to traverse the country from the Great Lakes to the Gulf of Mexico, terminating in the city of New Orleans, as its Southern end.

Alabama, so closely identified with the history of General Jackson and his march into New Orleans, naturally was looked to to provide the main trunk through this section of the nation. Mississippi contested this selection, however, by virtue of the fact that Jackson returned from New Orleans through that state, blazing his way through the virgin forests and building his own road for his army.

The statement has been sent broadcast throughout the nation that the road that Jackson builded at that time has never been generally improved and maintained, and in places today amounts to little more than merely a trail through the woods.

On the other hand, Alabama has a system of good

roads extending from the Tennessee state line to the gulf.

This system is of modern construction and a permanent nature. There are several ferries on the route, and two bridges are needed, in opposite extremes of the state, to complete an unbroken link in this great system. Provisions already have been made for the construction of these bridges, and the entire state, even the sections remote from the main trunk line, are enthusiastic over the construction and maintenance of the big system.

Tap lines and cross-roads have been and are being constructed from every direction into this main system of highway, and not a county will fail to be directly benefitted by its construction and completion. In addition to the north and south trunk line thus being provided, the Dixie Highway Association is pushing the rehabilitation of the Forrest Highway from Georgia through Alabama to the gulf. This road will run from Rome, Ga., to Birmingham, and thence through Montgomery to the state's only seaport. Common consent appears to have conceded that the trunk line south of this city for the Jackson Highway, also will be designated as the Forrest Highway.

October of the current year has been designated as the time when the official route of the Jackson Highway will be designated. Both Mississippi and Alabama are pushing good roads construction in the meantime, and the result will be, regardless of which route is selected officially, both states will be provided with the much needed great trunk lines of good roads, and eventually the Jackson Highway Loop will be recognized.

The State highway department is composed of men who are enthusiastic over the construction of good roads as a commercial proposition, and every aid and

assistance gladly its loaned to the various counties and sections making a study of the problems that confront them.

The splendid growth in the past four years, when the good roads mileage practically doubled, has caused the department to strive for a similar per centage of increase in the next four years, and the success that is meeting their efforts is causing optimistic predictions in that direction.

#### Record of Alabama County.

Out of 640 miles of public roads in Montgomery county, Alabama, more than 450 have been graveled, and are considered by experts the equal of any improved roads in America.

The present board of revenue have added 129.6 miles of graveled roads and made gravel deposits aggregating 63,000 yards on the Woodley and Carter Hill roads, thus insuring the future economical upkeep of these roads for the next twenty-five or thirty years.

These deposits, and the 129.6 additional new graveled roads have cost the county \$449,096.95, which have been taken care of from the income of the county.

In addition, the board during the same period put in 19 reinforced concrete and steel bridges at a total cost of \$33,494.58, thus making a grand total expenditure, without the issuance of a bond, of \$482,564.53.

But in addition to the graveled lands owned by the county when the present board went into office, the board has since purchased 82 acres of land, thus increasing the county's present holdings up to 132 acres of land, or a sufficient supply of gravel to maintain the roads, it is believed, for fifty or sixty years to come.

The benefits of good roads are general, but to the farmer they are many fold.

"It is impossible to tell in exact figures just how



Beautiful Stretch of New Alabama Road, Showing Fine Curves.

much good roads increase land values," says Hon. Logan Waller Page, Director of United States Office of Public Roads in Washington, "but it is generally believed that the average increase within the zone of influence of an improved road is from \$2 to \$9 per acre."

In Montgomery county it has been between \$5 and \$50 an acre, and in some instances even more.

#### University Aids Good Roads.

Charles H. Williams, secretary of the Extension Division of the University of Missouri at Columbia, has worked out a plan to help bring good and better roads to Missouri. The plan will affect more than 3,000 road commissioners, supervisors and overseers, whom it is to aid.

"It has been my desire ever since I took charge of the Extension Division to do something to assist in improving the roads in Missouri," says Mr. Williams. "I have been trying to make my department reach out to the people of every county of the state, and I know of no better way of doing this than by helping with the roads."

The Extension Division has obtained the cooperation of the faculty of the School of Engineering and will write to every road commissioner, supervisor and overseer and send them material on good roads without charge. Dean E. J. McCaustland of the School of Engineering was asked to prepare material and one bulletin has already been issued. Several others will be sent later at intervals of about a month. Anyone is free to ask questions, which will be answered by the engineering men who are experts on the subject of good roads.

More than 2,000 road commissioners, supervisors and overseers have received the first bulletin. It is estimated that there are 3,700 in the state, and this material will be sent to all as soon as their names and addresses are obtained.

The first bulletin is on "Country Roads." Various problems of drainage which are met in building ordinary dirt roads are considered, and suggestions as to structure are made. This bulletin was written by F. P. Spalding, professor of civil engineering in the School of Engineering, and edited by Mr. Williams. Other bulletins will be devoted to other phases of good road building. Each bulletin is prepared, printed and mailed at the expense of the Extension Division.

#### Cadillac Makes Good Record.

Charles B. Kane of the Kane-Cadillac Company states that in the laying out of the route of the new Southern National Highway from San Diego, Cal., to Washington, a Cadillac Eight recently achieved the distinction of making the 3,500 miles in 26 days.

"The expedition was planned and executed by the Cabrillo Commercial Club of San Diego, for a preliminary survey, or path-finding tour, over a transcontinental route which will be open to motor touring all the year round. When the new highway is realized, it will traverse eight states—southern California, Arizona, New Mexico, Texas, Arkansas, Tennessee, North Carolina and Virginia, with a Gulf division proposed through southern Texas, Louisiana, Mississippi, Alabama, Georgia and South Carolina. San Diego will be the western terminus and Washington, D. C., the eastern.

Wilbur Hall, a magazine writer who made the trip in the route-finding Cadillac, says that if the good-roads movement which is now sweeping the south, continues

to gather impetus, it is only a question of months when the bad stretches will be surfaced. The new highway gives tourists a chance to visit the Grand Canyon of Colorado, traverses stretches of desert, the interesting copper country of Arizona, and takes him through the real south. However, desert running is made easy for motor cars, especially between the Imperial valley of California and the Colorado River. Here engineers have devised a double plank trail for automobiles, so that the motorist glides smoothly over sands that baffle pedestrians and burros.

#### New National Highway Promoted.

Southern cities have been asked to join in a movement to build a highway from Washington, through Roanoke, either Atlanta or Chattanooga, and Birmingham to Southern points.

V. D. L. Robinson, Secretary of the Chattanooga Automobile Club, has written Victor Hanson, publisher of the Birmingham News, suggesting that Birmingham cooperate with the Chattanooga and Knoxville boosters to have the road brought through Birmingham. A conference to discuss the road was held at Roanoke May 22, when steps were taken for concerted action in behalf of the road.

The movement was launched at a meeting at Roanoke last year, and J. S. Gallison was named temporary chairman. The road from Chattanooga to Knoxville, Bristol, Roanoke and Staunton to Washington is said to be now travelable, and in fairly good shape, and it is stated that by extending the movement through to Birmingham much could be accomplished in getting the road improved between Birmingham and Chattanooga.

#### Savannah Draws Highways.

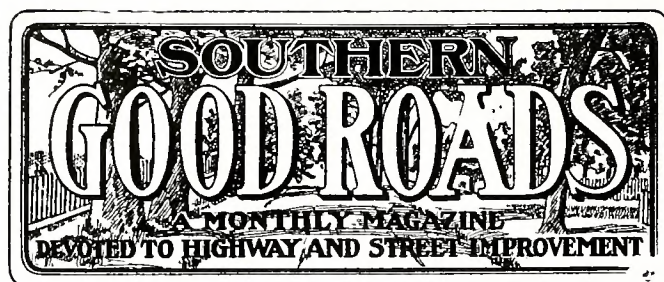
Savannah has been officially designated as the southeastern terminus of the George Washington National Highway—a transcontinental route from Seattle to Savannah—Mills B. Lane of Savannah has been elected vice president for Georgia, Courtney Thorpe of Savannah has been elected treasurer of the highway and that city has been chosen for the next convention.

The route selected will have as the pivotal points the following cities: Spokane, Missouri, Billings, Cody, Deadwood, Sioux City, Sioux Falls, Omaha (headquarters), St. Louis, Memphis and from that city to Decatur, Ala. At this point there are two routes suggested. One will have to be decided upon as follows: Decatur to Chattanooga to Atlanta then to Savannah. The other will be from Decatur to Birmingham to Atlanta, thence to Savannah.

#### New Embankment Protection.

Along some of the mountain roads of Switzerland, the engineers substituted for fences, the usual guard against vehicles leaving the highway, a row of large blocks of concrete or roughly dressed stone. The same kind of protection against accident was used last year on a road near Lambertville, N. J. In order to keep vehicles suffering a mishap from sliding down a bank into an adjoining canal, heavy blocks of stone about 3½ feet long have been set vertically 3 feet apart, measuring between their centers. They were embedded at least 1 foot in the earth and afford a much stronger protection against such an accident than the wooden fence ordinarily used on embankments.

Hinds county, Miss., is spending \$50,000 to build a good road from Big Black to Jackson.



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**COME TO WILMINGTON.**

The program for the meeting of the North Carolina Good Roads Association at Wilmington, as outlined in this issue, is one of the strongest we have noted in some time. There are a number of live issues that the road makers of the Old North State are determined shall be put on the way to immediate settlement. They know that the sentiment of progressive people in their state is behind them and are going to urge that the legislature meet the needs at its next session during the coming winter.

The Association could hardly find a more pleasant place to meet than at Wrightsville, "The Atlantic City of the South," where every beach delight is obtainable. The railroads and business organizations are cooperating to a gratifying degree. The largest attendance at any road meeting ever held in North Carolina is confidently expected.

**THE WOMEN SPEAK OUT.**

The old idea that the matter of good roads was an issue for the men solely is going the way of many other outworn shells. The action of the Federated Clubs of Tennessee in inviting their sisters to cooperate with them in beautifying the Dixie Highway ought to be the signal for all other women's clubs in every state of the Union, and especially in the South. It will be easier to get quick results in beautifying Southern roads than

any other, owing to the fact that a greater variety of trees, shrubs and flowers grow here, and grow more quickly. The picture in this issue of what beautification is accomplishing on Florida roads will be an inspiration to other Southern states. The Tennessee meeting ought to be one of the most interesting yet held for the cause of up-to-the-minute public highways.

**VALUABLE ROUTE MAP BOOK.**

One of the most attractive map and route books we have seen published has just been issued by the North Carolina Good Roads Association and is entitled "Road Maps and Tour Book of Western North Carolina." This will fill a long-felt want not only for the tourist wishing to spend his vacation in the Southern Appalachian Mountains; but it will be a valuable guide to the home-seeker and investor as it gives in detail not only the roads through this section, but considerable information in regard to the resources of the various counties. It shows the entrances into the mountains from the east, south and west and points of interest along the various roads are illustrated with cuts made from photographs of characteristic scenes along these roads. If you are going into the Blue Ridge or any portion of western Carolina this summer, you cannot afford to miss having this accurate and instructive guide.

**How Bonds Save Money.**

Better roads can be secured without higher taxes, according to the experience of Tama county, Iowa. Tama county finds that it will cost her \$255,000 to permanently grade and drain her entire county road system. At the present rate of progress under the plan of building what they can after making temporary repairs on their temporary roads they find it will take them a great number of years to complete their job.

By adopting the bonding method they have figured out that they can complete their work in three years time, doing one-third of the job each year. Over and above their present income it will require them to sell \$156,600 of bonds. They are allowing \$85,000 for the expense of dragging and maintaining the roads over the six year period.

These estimates are based upon experience. Interest on the bonds through the six year period will amount to \$23,000. By adopting the bonding plan they can have permanently graded and drained roads within three years' time without a dollar of additional taxes and can maintain them. They have found that the cost of interest on the money is very small when compared to the cost of maintaining temporary roads by temporary repairs until such a time as money can be secured out of annual levies to enable the Board of Supervisors to make permanent improvements.

**Road Builders in Boston.**

The next or fourteenth annual convention of the American Road Builders' association, known as the Seventh American Good Roads Congress, and the Eighth National Good Roads Show will be held in Mechanics' hall, Boston, Mass., during the week beginning February 5, 1917.

This decision was reached by the board of directors at its meeting held recently at the Hotel Astor, New

York City, after giving careful consideration to the invitations from and the facilities afforded by such other cities as Philadelphia, Pa.; Buffalo, N. Y.; Cleveland, O.; Atlantic City, N. J.; Chicago, Ill.; St. Louis, Mo.; New Orleans, La., and Kansas City, Mo. It is understood that the plans for the show are now being completed and further announcements will be made soon. It is confidently believed by the directors that the Boston convention and show will bring together by all odds the largest gathering of the kind ever held at any time or place.

#### **In a North Carolina County.**

For fifty years money has been spent on the roads in Cumberland county with practically no results to show for the labor done. One year ago real work was begun on the roads, and they are being properly built by the most approved methods of sand-clay construction. Special attention is being paid to drainage with berm ditches and outlets for the water. The funds are limited and the force is small, however. Thirty convicts are used and twelve mules, under a competent foreman. About two miles a month can be built by this means, or twenty-four miles in a year. A proper force would be thirty convicts and thirty-two mules, the rule being two mules in addition to a mule for each convict. With such a force six miles could be built in a month. There are 420 miles of road in the county.

In place of a twenty-minutes drive through sand to go one mile, as formerly, a Ford car can make eight miles in twenty minutes over the improved road. Four times the load can be hauled over the road.

See the Hope Mills road or the Yadkin road as an example of what the county is doing. Land has jumped from \$2.00 an acre to \$10 an acre on these roads. Both county and state are now working on a system that will permit the use of Federal funds on the roads.

It is surprising how much the commissioners have done with the limited force at their command, in removing the sand trails and giving good, solid hard sand-clay roads. The roads are costing but \$400 a mile to build with the present force.

Mr. D. H. Winslow, United States engineer on the Washington to Atlanta Highway, has approved the good roads built in Cumberland county under the direction of Mr. T. G. McAlister, chairman of the County Board of Commissioners and superintendent of roads.

#### **Road Tour Book of Western N. C.**

"Road Maps and Tour Book of Western North Carolina," just off the press, and published by the North Carolina Good Roads association, is a constructive work, and one that fills a long-evident need for authoritative road information of this section.

The book is handsome typographically, with its neatly gold-lettered red cover, and is of a size designed to fit the coat pocket. It contains maps of the main traveled highways of this part of the state, together with the highways from Greenville and Spartanburg, South Carolina, to Asheville. It also contains a brief description of the counties and cities of the section covered by the maps. It is published by the North Carolina Good Roads association, in co-operation with the state highway commission. The book is published under the direction of Joseph Hyde Pratt, state geologist, and the roads were logged and all map information obtained by D. Tucker Brown and Highway Engineer John D. Wal-drop.

The information in the road book is valuable for the

simplicity with which that information is conveyed. The road from Asheville to Hendersonville, for instance, is shown, and a dozen scenic or other fixed points indicated on the map enable the motorist to immediately locate himself without trouble. Many of these scenes are illustrated in the book, and the greatest pain has been taken to have all the information absolutely correct.

#### **Road Impetus Around Lynchburg.**

The movement for good roads has received a wonderful impetus in Campbell and adjoining counties recently, and already nearly \$200,000 has been provided for new work in Campbell and Pittsylvania counties, while another magisterial district in Bedford county is moving for a special election to decide upon a bond issue for the same work.

Brookville District, in which all the Campbell county suburbs of Lynchburg are located, has voted \$200,000 for roads, most of which are to be built of a tar-binder construction. Seneca District has voted for \$40,000 to improve one or more of the roads that Brookville District will improve, and it is expected that Rustburg District, which lies between the two, will ask for an election to carry these roads across that district.

In Pittsylvania the supervisors have ordered the improvement of eight miles of roads in Banister District and twenty in another, the work to be done under the supervision of the State Highway Commission.

#### **DuPont Products Book.**

George Frank Lord, manager of the advertising division of the DuPont Company, is sending out a complete little booklet listing their products, with the following note of explanation:

"We are enclosing a copy of our Du Pont Products Booklet, bound in Fabrikoid, which is just off the press. We think same will be of interest to you and that it contains information that you will be pleased to impart to your readers.

"As you no doubt know we are constantly expanding our industrial activities along constructive lines and the information contained in this book is the 'last word.' There are 251 distinct commodities listed, with an explanation of each one.

"If any of these products are new to you, and you desire additional information on same, or want special literature sent to you, we will be pleased to supply you. In fact we will welcome inquiries from your readers and friends."

#### **Tennessee "Good Roads Day."**

Thursday, July 27, has been set aside as Good Roads Day in Tennessee by Governor Rye, at which time every citizen in the state has been invited to take his shovel and pick in hand and devote the day to the betterment of the roads in his community.

It is mentioned by the Tennessee Department of Highways that more than 130,000,000 has been spent in the state for road improvements in the last fifteen years. In 1913 and 1914 forty-four counties in the state spent a total of \$12,474,298 derived from bond issues in building better roads.

The sum of \$8,000,000 was appropriated through county courts and bonds issued for roads during 1915. Adding to this the amount of free labor and cost of bridges and the total for 1915 approximated \$12,000,000.

# Eastern Carolina Waking Up

By **EDITOR LASSITER**  
**Smithfield Herald**

**I**N Wednesday of this week the writer had the pleasure of making a trip over the Washington-Atlanta Highway from Smithfield to Benson, a distance of sixteen miles, with Mr. W. S. Fallis, State Highway Engineer, and Mr. D. H. Winslow, United States Engineer in charge of Maintenance, northern division of the above named highway. Some of the changes that have taken place along this road in the past few years are almost as startling as were the changes Rip Van Winkle saw after waking from his thirty years sleep.

In the first place the many deep sandbeds which have been the dread of many a traveler have all been banished and in their place there is a good solid road-bed fit for heavy travel three hundred and sixty-five days in the year. It is true that not quite all the road between Smithfield and Benson is up to the standard the good roads people are striving for, but fine results have been attained and the work is still going on.

In many places the road has been widened and straightened. Wooden bridges across the road have given way to the more substantial metal and cement culverts. There are a number of these through Ingrams township.

## Road Building at Small Cost.

This road has different constructions. Part of it is sand-clay, part gravel and other parts are what is known as top-soil road. Some of the best parts of it are the sand-clay section through Banner township. This kind of road can be built for \$400 per mile in this section. The gravel road is the more substantial and will last longer if properly looked after.

This road runs through parts of Smithfield, Ingrams and Banner townships. Smithfield and Banner townships are building and keeping up their roads by a system of taxation while Ingrams is building hers by a bond issue. Of the three townships, Ingrams' part of the Highway is better than is either Smithfield's or Banner's. Both the latter, in addition to the funds derived from taxation, have been helped some in their road building by private donations. Banner has received considerable aid in this way.

Mr. V. E. Towles, U. S. Roads Engineer, has had much to do with the construction of the good roads in Banner and Ingrams. His work shows how important it is to have a road engineer to plan and direct the work. Much good money has been wasted in road building because the people in charge were too short-sighted to get a good engineer and build their roads according to approved plans. Mr. Towles has been giving aid to the Smithfield road commissioners for the past few weeks.

The people living along the line of a good road catch the spirit of progress and begin to improve their premises. We noted a number of homes along the Highway where the hand of progress was leading into better things. The yards were planned systematically and roses and other shrubbery had been planted to beautify the home-grounds.

Road signs have also been placed all along the route of the Washington-Atlanta Highway from the Wake line to the Harnett line. These signs which have been furnished by many of the progressive merchants show

the distance from place to place. We are glad to see this. It should have been done long years ago. The red, white and blue signs keep the stranger in the right road without any trouble whatever.

## Engineer Winslow on the Job.

Mr. Winslow has been in charge of the maintenance of this section of road for nearly two years. He has been interested in season and out of season and has the happy faculty of giving to others some of the enthusiasm that ever characterizes himself. He goes over this road every two weeks and watches every point and keeps in touch with the road commissioners and patrolmen along the line. He points out to them the weak spots and in most cases he has the cooperation of the local road forces in the good work. The patrol system is kept up through the appropriation made by the local road commissioners and used under the direction of the road engineer in charge of the division.

The work of the United States Government in this direction is two-fold. It is aiding largely in the work by bearing the expenses of the engineers and inspectors, and also by making the roads under its supervision models and an inspiration to other sections of the counties through which they pass.

When Mr. Winslow began this work nearly two years ago there were seventeen fords on the Washington-Atlanta Highway on his division from Clarksville, Va., to Fayetteville, a distance of 267 miles. Now there is only one, and that is in Johnston county about two miles north of Benson. The other sixteen have been replaced by culverts and bridges and the automobilist can pass over the road without once getting in the water save at the place mentioned above. This ford will be done away with before the present year closes.

We are just beginning the good work of road building. As soon as the people understand the real benefits to be derived by having better roads there will be no further opposition. With careful management of the road funds and the proper work in road construction we shall soon have the hearty co-operation of all the people in the work which means so much for the future progress of this section.

## IT WILL LAST A LIFE TIME.

A decided trend toward a lighter built car is heard and observed, together with an increasing demand for simplicity in construction—all tending toward a more economic upkeep. The owner who drives and takes care of the car himself is daily increasing in number. The element of simplicity has an important bearing where the owner's individual attention is thus given, for a simple car is more easily understood, is easier to drive and maintain. Also, this has much to do with the life of the car, a most important factor in automobile ownership. Too many cars grow old prematurely through neglect and misuse. There is no excuse for this, as little time is required in the occasional tightening of bolts, readjusting and cleansing. With many this grooming is in itself a recreation and regarded as a wholesome exercise.

And of late the fact has been impressed upon all that the vehicle of the family, owned and enjoyed for a per-

riod of some years, needs little care in its mechanism and finish to continue to serve faithfully. The dramatic end of the deacon's one horse shay is not expected of it, to be sure; yet, one is reminded of the career of the railway locomotive, where, with renewal of parts, as a

single unit it serves its purpose apparently indefinitely. In purchasing a car then, one may well bear in mind that he is not investing in a toy of the moment, but acquiring a perpetual asset never without a value when properly cared for.

## Senate Passes Bankhead Bill

SENATOR BANKHEAD, of Alabama, has within the last month achieved the greatest constructive triumph of his life in the passage by the United States Senate of the bill providing for the building of good roads in this country under conditions respectfully jealous of the limitations of the Constitution, the necessities of the people and the rights of the states. The Bankhead bill has been passed by the Senate by a safe majority and is a substitute for the Shackleford Bill which passed the House by an overwhelming vote some weeks ago. It will now go to conference and as it covers the provisions in the Shackleford Bill, and more, it will doubtless be agreed upon by the two Houses and become law with the approval of the President.

The bill authorizes the Secretary of Agriculture to co-operate with the States, through their respective State highway departments, in the construction of rural post roads. A rural post road means any public road in the United States over which the United States mails are transported. A state highway department means any department, commission or official or officials charged with the work ordinarily directed by highway departments. The bill provides that the roads built under its terms shall be "properly maintained," which means that they shall be kept in as good condition as when they were first built. It is further provided that the roads constructed under this law shall be maintained by the states or by subdivisions of the states.

The bill appropriates, "out of any money in the treasury not otherwise appropriated," the sum of \$75,000,000 for the construction of rural post roads in the states and \$10,000,000 for the building of roads in the national parks. The appropriations are to be apportioned among the several states in this manner: One-third in the ratio which the area of each State bears to the total area of all the states; one-third in the ratio which the population of each state bears to the total population of all the states, as shown by the latest available federal census; one-third in the ratio which the mileage of rural delivery routes and star routes in each state bears to the total mileage of rural delivery routes and star routes in all the states. For the fiscal year ending June 30, 1917, the sum of \$5,000,000 will be appropriated; for the fiscal year ending June 30, 1918, \$10,000,000; for the fiscal year ending June 30, 1919, \$15,000,000; for the fiscal year ending June 30, 1920, \$20,000,000 and for the fiscal year ending June 30, 1921, \$25,000,000.

### States Must Do Part.

The management and distribution of the road-building fund will be in the hands of the Secretary of Agriculture who is authorized "to make rules and regulations for carrying out the provisions of this Act." The act specifies that "no money apportioned under this act to any state shall be expended therein until its legislature shall have assented to the provisions of this act." The Secretary cannot pay out any money on any road project until the plans, specifications and estimates for such project have been submitted to him and

approved by him; nor until he has received satisfactory assurance that the state has provided in money, labor and material an amount equal to the amount to be received from the United States for expenditure on such project; nor until satisfactory agreement shall have been made on the part of the state that the rural post road built under the terms of the Act "will be properly maintained by the state, or any subdivision thereof." The Secretary of Agriculture cannot make any payment for road construction under the Act "in excess of \$10,000 per mile, exclusive of the cost of bridges of more than twenty feet clear span."

These are in general terms the principal features of the Bankhead good roads bill. His management of it in the Senate was altogether admirable. He insisted upon the fullest discussion of its terms, preserved his patience under the severe provocation at times, sought to have every constitutional or legal objection removed and after a hard but inspiring contest carried it through practically in its original form. No measure providing federal aid for public purposes has ever passed the senate in which greater care has been taken of the interests of the government. Of course the "Constitutional lawyers" were on guard throughout the debate and the guardians of the rights of the states also; and there was, besides, a most instructive discussion of the good roads question in all its economical, business and social aspects. As for example, when Senator Owen showed by carefully prepared statistics that "the commercial value of good roads would mean a saving of a thousand million dollars annually" to the people of the country; that "improved roads mean improved schools and churches;" that good roads in the rural districts would prevent the drift from country to town, would obviate the congestion of traffic, would promote the public health, would make it possible, by "reclaiming waste places with proper cultivation," for the farmers with easier and passable roads to market to "easily produce over twenty billions of wealth per annum—a sum nearly equal to the total accumulation of a century in the banking resources in all our 25,000 banks."

### Federal Aid is Proper.

Emphasizing the necessity of government aid in the construction of good roads, Senator Underwood said: "The whole history of the building of roads in the civilized world has demonstrated the fact that there has never been a great system of roads built in any country until the government of that country stood behind it in some way."

Senator John Sharp Williams who has the reputation of being something of a strict constructionist, declared that "the constitutional power (of Congress to pass this bill) is undoubted, obvious, plain and palpable," and that "wherever there has ever been any people who ever proximated a civilization, a self-developed civilization, a characteristic civilization of any sort, good roads have accompanied that civilization." "All the roads of Rome were strategic roads, and commerce

grew up upon the road, so that the road was the cause of the commerce rather than the existence of the commerce the cause of the construction of the road. But with us we have not only the strategic military reason, which is national, the interstate-commerce reason, which is national, the post-road reason, which is federal, but the other reason which I have mentioned, which is educational. There can be no interstate commerce of any great power unless there be good roads for a local commerce forming connecting links upon which the interstate commerce is founded, nor can there be any great international commerce except for the intrastate commerce of the various countries which form the family of nations."

It will be seen that the Bankhead good roads bill is the work of sound statesmanship and not merely an effort to separate the government from its money in the aid of local enterprise or to promote a doubtful undertaking. The Bill is as big as the great country it represents and as broad as the humanity it would serve. Its enactment will take the public highways out of politics and make them thoroughfares for commerce and industry instead of paths to public office. Its administration will be in the hands of the Department of the government nearest to the people in all their varied interests. It will strengthen the relations between the states and the nation making them active partners in a great work for the common good. It is assumed that the Senate Bill will be agreed to by the House and that with the beginning of the new fiscal year the great enterprise of making the paths of the country straight will be undertaken with the sure hope of success.

#### Patrol Work in Tennessee.

State Highway Engineer A. M. Nelson recently made a trip to East Tennessee in the interest of the work of the department. The direct object of Mr. Nelson's visit was to look into the matter of extension of the government patrol system on the Central highway of North Carolina, which is being extended through Coker and Hamblen counties in this state, the idea being to create a connecting link eventually in the Memphis-to-Bristol highway.

It is stated by Mr. Nelson that engineers recently made a trip from the Atlantic coast to Asheville, N. C., with a view to establishing average cost of maintenance by the patrol system. This inspection tour will, it is said, be soon made as far as Morristown, Tenn. There is said to be about forty-eight miles of road to be constructed in Coker and Hamblen counties. The patrol system is said to be greatly in the interest of economy and efficiency, guaranteeing continuous maintenance of roads at small cost and rendering it unnecessary to rebuild roads entirely every few years.

Engineers are now at work locating a route for the Pinehurst-Charlotte Highway in North Carolina. This is an important road that will break the barriers to travel along the Yadkin river and will form an important connecting link for several highways of national importance. It will pass through Badin, the wonderful aluminum city now being built.

The Yellowstone Trail Association has issued the challenge for an automobile race from the Atlantic to the Pacific over the Yellowstone Trail and the Lincoln Highway. They contend that the northern route is now the best and want a show-down.

#### THE 1916 AMERICAN TOUR AT SLIGHT COST.

(By John Thomas Jasper.)

THE question of expense very naturally has heretofore governed largely with many when contemplating the family's annual outing. It will reach many as surprising, perhaps, that to him who owns an automobile—should the family agree as to the enjoyment of the highway and the roadside bivouac—it remains to be determined only the matter of time to be given over to the recreation, as the expense is found to offset practically that of the usual household for the same period. Of course, in this way as in other methods of travel and sightseeing, one may set one's own limit of expenditure; but those who may consider detail of cost may be interested in the statement that, to all intents and purposes, the benefits of the outing, the change of air and scene may be thus enjoyed so far as the difference in the cost is concerned. This has been demonstrated by some clever estimates and has worked out as an actuality.

The highway during the coming season will be found dotted, mile upon mile, with the automobile, by night and by day, for the camp will be where night happens to fall. With a gratifying foresight as to what may be needed in the camp, there is now offered a stock from which may be selected many devices for the comfort of highway touring—to those who appreciate and understand

"Tongues in trees,

"Books in the running brooks,

"Sermons in stones,"

and the thousand delights of the open.

A demand is everywhere for tents that take up little space, and these are made in many varieties of size and convenience in setting up quickly. There is about every kind of camping outfit imaginable, sleeping bags and beds in single and double deck arrangement; humidors, cellarettes, collapsible stoves and refrigerators in all manner of design. There will be the opportunity for the good housewife-traveler to exercise her skill in stowing and carrying, for there are dust-proof cases to be had, capacious wall pockets, hat boxes for the running board, besides alluring touring garments ad infinitum; also a chance for him in command of the trek to make good his boast of knowledge of forestry, camp life—fire-building in wind and rain, etc. While it would seem his every need has been anticipated, yet the field is wide with no limit to his improvising.

Where exigencies exceed the ordinary carrying capacity, the modern light trailer has been found to completely fill the requirement. And the camp, of course, is a matter of choice after all, for the American towns are not so widely separated, and the comfort of hotels may be had when necessary at but slightly added expense.

The Woman's Federation of Clubs in Tennessee have invited similar organizations in states along the Dixie Highway to meet with them and consider plans for beautifying the entire route of the Dixie Highway.

Missouri has one of the liveliest road clubs in the country, known as the Greater Springfield Club. Since its organization it has been active in promoting the issuance of a million dollars worth of bonds in its territory and is now promoting to state highways. It gives its services free in helping sell road bonds and is composed of business men of high ability.

# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### Florida.

A communication from the National Highways association shows the routes of the proposed national highways in the state of Florida. The Tamiami trail the Dixie highway, the National highway and the Old Spanish trail are the roads shown. Due to its peculiar shape and the fact that it is the idea of the National Highways association to circle the country, keeping as near to the coast as possible with strategic routes from the interior, a few roads are able to serve nearly the entire state.

The roads shown pass through all but seven of the state's fifty-three counties and thus serve directly 90 per cent. of the entire population of the state.

There are 17,579 miles of public roads in the state now, of which the proposed national highways will make 14.96 per cent with their 2,630 miles of road. At the present time about 14 per cent. of the roads of Florida have been improved and hard surfaced to greater or less extent.

\* \* \*

### Illinois.

In a forecast of the year's work filed with Governor Dunne the state highway commission of Illinois estimates that 472 miles of state-aid road will be constructed this year, divided as to type as follows:

	Miles.
Brick .....	11
Concrete .....	58
Gravel .....	22
Water-bound macadam .....	5
Bit. macadam .....	6
Oiled earth .....	250
Plain earth .....	120

These figures are approximations, based on the type of road the county has selected, the amount of money available, and the estimated cost of construction.

Sixteen thousand miles of roads are included in the designated state-aid routes ultimately to be improved out of a total state mileage of 96,000. It is estimated that these routes, while but 7 per cent of the total state mileage, carry 80 per cent of the traffic.

The legislature in 1913 appropriated \$1,100,000 for state-aid road work for the biennium of 1914-1915. The following session of the legislature in 1915 appropriated \$2,000,000 for the biennium of 1916-1917. These appropriations are allotted to the counties in the proportion of the road and bridge tax of the county, and must be met by like sums before they can be available to the county.

At the close of the last calendar year there had been constructed some 115 miles of state-aid roads, of which 90.4 miles are of concrete, 22.4 miles are brick, 1.2 miles are gravel, and one mile macadam. There were also eighty-one bridges included in the state-aid work up to this time. Total cost of this construction was \$1,497,407, which was met equally by the state and counties.

\* \* \*

### Kentucky.

Commissioner of Roads Terrell recently said that there would be \$4,000,000 spent in Kentucky this year

on the construction and reconstruction of roads under the supervision of his department.

There will be 103 counties given state aid, and three counties, Harlan, Bath and Anderson, have asked for convict labor. They probably will be furnished this labor after the new board takes up its duties in July. Twenty-five counties are working the roads under the supervision of the department. The state will be divided into thirteen districts, and each district will have inspectors and engineers.

\* \* \*

### Missouri.

A good day's work was done in St. Louis county on February 15. On that date the voters of the county, after an exhaustive discussion of the good roads question, the value of permanent highways to all classes of citizenship, and the superiority of a bond issue plan for getting permanent and satisfactory results, to the old one of continuing and increasing road taxes for getting results neither permanent nor satisfactory, voted by an overwhelming majority in approval of a \$3,000,000 bond issue. The hope and expectation that, after such a discussion, and such a verdict, other counties in Missouri would take early action, is being justified. Jefferson county has, since then, reversed its action of a few months earlier and voted a \$500,000 bond issue, also by a heavy majority. Now Wayne county, another county in the Ozark region, votes a \$200,000 issue by a vote of five to one.

These are but preliminary movements along this line of action. Missouri is enlisted for the war. The momentum is unmistakable. St. Charles and Franklin counties have already perfected strong organizations working toward the submission of road bond propositions, and their approval by taxpayers. In Audrain county preliminary work is under way. Northern and Central Missouri counties which have hitherto been apathetic if not hostile to such proposals, are likely to take a second thought. The slogan of the movement might well be: Build good roads for ourselves and posterity and let posterity pay its share of the cost.

### Lane County Leads Oregon.

Lane county has the highest percentage of surfaced roads of any county in that state, exclusive of Multnomah and Columbia counties, according to the annual report submitted by H. W. Libby, county surveyor, recently. Columbia county, however, has but 220 miles of county roads, while Lane county has 1567 miles.

In Lane county 108 miles are surfaced with crushed rock or broken stone, while 402 miles are gravel and 27 miles are planked, a total of 537 miles of surfaced roads.

Citizens of Georgia are getting earnestly behind the proposition of a state highway commission. A realization that two million dollars that might come to them through Federal aid stands a good chance of going to some state with organized forces has bestirred the Georgians. They will urge the legislature to act this summer.

## GOOD ROADS NOTES IN BRIEF

Operations on road building in Jackson county, Tenn., which were delayed for some time by obstructive litigation, have now been resumed in full force.

A recent convention of road men in Omaha determined to begin active work in the promotion of the "George Washington" to have its termini at Savannah and Seattle.

The Massachusetts Highway Commission has evolved a scheme for making good roads by heating sand with oil. The method is said to eliminate much trouble in districts where deep sand prevails.

Pennsylvania observed May 25 as "Good Roads Day" throughout the state. Governor Brumbaugh took deep personal interest in its wide promotion.

The Austin-Bennett Construction Co. has been awarded the contract for the Petersburg-Hopewell highway, the cost to be \$122,000, jointly borne by county, city and the DuPont people.

A Cadillac car logging the Southern National Highway from San Diego to Washington made the 3,500 trip in 26 days.

Kansas City has embarked upon building a fine highway to be known as the W. R. Nelson road, in honor of the founder of the Kansas City Star. Mr. Nelson fought many years in behalf of the roads cause.

Muscogee county, Ga., now has completed 125 miles of fine roads and the county is not in debt for them one cent. There is a mile of concrete bridges in the system.

De Witt county, Texas, has let contracts for roads, bridges and culverts to cost over \$76,000 and to be completed within 150 days.

Work was begun May 23rd in marking in colors the route of the Oklahoma, Texas and Gulf Highway, which intersects several important national roads.

Nicholas, Ballard, Madison and Spencer counties in Kentucky are awarding contracts for new road construction this month.

Jefferson county, Mo., has formed road improvement district No. 15 for the purpose of building a forty-mile pike and free bridge. \$195,000 is made available under the act creating a commission.

\$60,000 will be spent this summer in building a good automobile road around Eureka Springs, Ark. Places catering to tourists are making way for the coming of auto traffic.

By a vote of about three to one the Salem, Va., magisterial district last month voted a good roads bond issue of \$125,000. Roanoke county already has a good mileage of modern roads.

Cass county, Mo., is another one of the communities putting up a game fight for better highways. Her citizens will vote this summer on a bond issue of one million dollars.

Work has begun on the Chattanooga-Cleveland road by the Tennessee commission. This will be officially be known as "State Highway No. 1," built under the state aid law.

Gaston county, N. C., commissioners awarded contracts last month for the construction of four important links of road. \$50,000 of a recent bond issue of \$150,000 was set aside for maintenance.

Avery county, N. C., road commissioners have received bids for the construction of twelve highway bridges.

### America Just Beginning.

The United States has only begun to spend money on road building, says a Missouri editor. In Florida, for example, there are a total of 1,752 miles of improved roads. In England and Wales, less in area than Florida, there are 150,908 miles of improved roads. Five years ago the authorities expended \$40,000,000 on the England and Wales roads, which is more than one-sixth as much as was spent on all the roads in the United States in 1914.4

There are in all 2,240,000 miles of public roads in the United States, but only 10 per cent of them are classed as improved roads. The German empire, which is not so large in area as the state of Texas, has 36,000 miles of improved roads, or more than all the United States together. In Prussia alone the annual expenditure on roads, previous to the war, was \$35,000,000.

Ten years ago the annual expenditure for road building in this country was only \$79,000,000 and the increase to \$235,000,000 indicates the growing popularity of the movement. But it is destined to grow still more. The tremendous mistake of the European war will give this country an opportunity to catch up and pass Europe in the way of good roads. Prussia, burdened with a big war debt, will not have \$35,000,000 to spend year on road building in the years to come. England and Wales will have to let road improvements on a large scale go by the boards for a decade or so. It is America's opportunity in the road building line, and an opportunity that must be grasped.

Alton county, Ill., good roads boosters have begun agitation for a million dollar county good roads bond issue.

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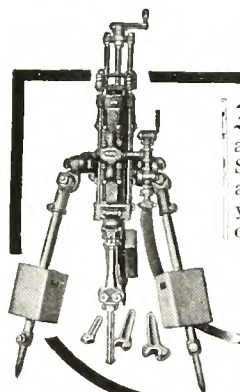
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### Abandon Yearly Auto Models.

The yearly model—the most confusing thing that was ever perpetrated upon the automobile buying public—has been abandoned by at least one big automobile concern, and it is to be hoped that others will follow. President J. Walter Drake of the Hupp Motor Car Corporation, has announced that, starting with January 1st, Hupmobiles will be designated by series and not by alleged yearly, such as 1916, 1917, 1918, etc. The present model Hupmobile which was first brought out as the 1916 Model "N" will be known hereafter as the Series "N" Hupmobile.

"One of the bad habits the automobile manufacturer fell into early in the business, was the announcement each season of a yearly model" said Mr. Drake. "At first, these models were legitimately announced at the first of each year, at the time of the New York Shows, but gradually one manufacturer after another kept moving up the date of announcements of these yearly models, until the competition to be the first to bring out new models became as keen as the production of high grade automobiles. It became so bad that some companies, this season, brought out their 1916 cars in April of 1915. Other companies, in order to meet the competition, followed in rapid order.

"This practice has been most confusing to the automobile buying public, and most unfair to owner, dealer, and manufacturer alike. It also lead to many mis-statements and in some cases, when a certain type of car would not sell readily, the maker would make a few minor changes and announce a new yearly model. The public, unaware of this clever selling scheme, would demand the new models of the more re-



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Every dollar you cut the cost of road grading is a dollar added to your net profit. We can put you in touch with one man who says he cut the cost of road grading in Louisiana from \$26 per mile with mule power to \$4.50 per mile with Mogul kerosene tractor power. His figures are in the official records of his parish.

That is probably an extreme case, but the fact that so large a saving as this could be made, is interesting. It suggests that possibly your costs are higher than they need be. Perhaps a little investigation would pay. Would you like to see some of the figures we have collected—some of the savings we have helped other contractors and road builders to make by changing over to Mogul or Titan kerosene tractor power? They'll cost you nothing but a two cent stamp and a little time. Write for them.

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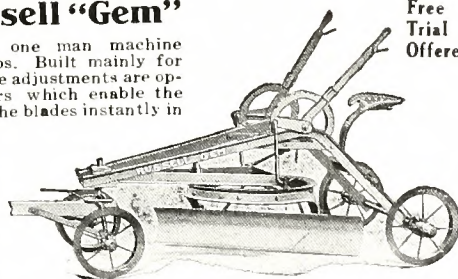
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liable concerns, and I am sorry to say, we were often led into making early announcements.

"The old plan was also unfair to those who had already purchased cars, for immediately upon the announcement of the new yearly type, the value of the former year's Model, and all its predecessors, decreased in value, unjustly, both for cash sales and trading purposes."

Christian county, Ky., voters will probably be called upon to vote on a bond issue of \$400,000 or more for good roads this fall.

Contracts have been let for state aid roads in Monroe and Lee counties, in Alabama. The Lee road is part of a system between Opelika and West Point.

The Jefferson Highway good roads conference will be held in Memphis, February 20.

Suez township, in Mercer county, Ill., will oil twenty miles of good roads early this summer. This improvement is being done at a cost of only 1½ cents per acre to land owners along the road.

Illinois has a recently enacted law that makes it compulsory that from \$3 to \$5 per mile be set aside for the dargging of public roads in each township.

Bexar county, Texas, spent \$550,000 bonds in thirteen months in building good roads. 359.71 miles of new road was constructed and fifty-six thoroughfares were improved in that time. A general road budget provided \$121,355.32, making a grand total of \$671,355.32 spent in quickly providing improved highways.

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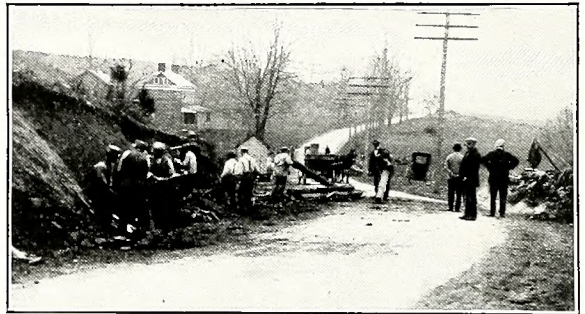
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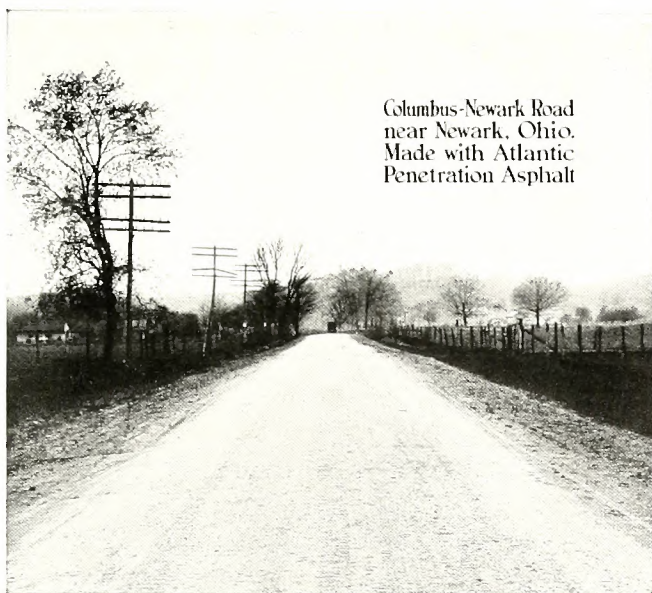
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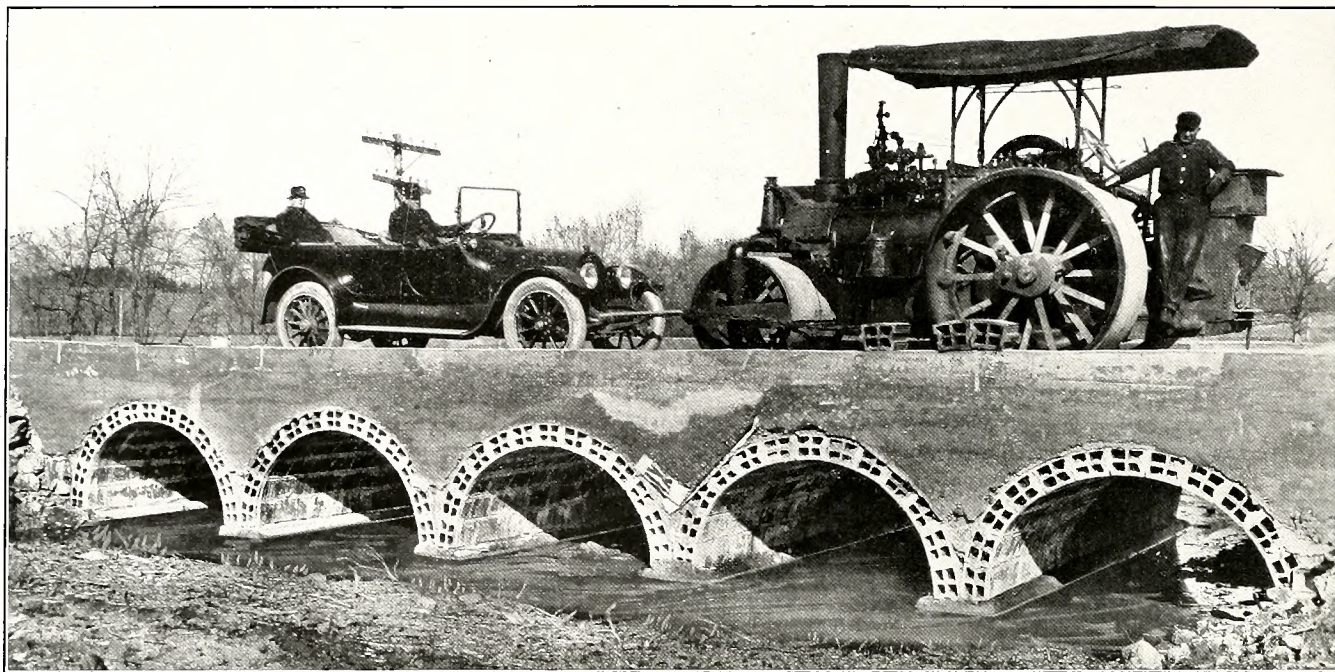
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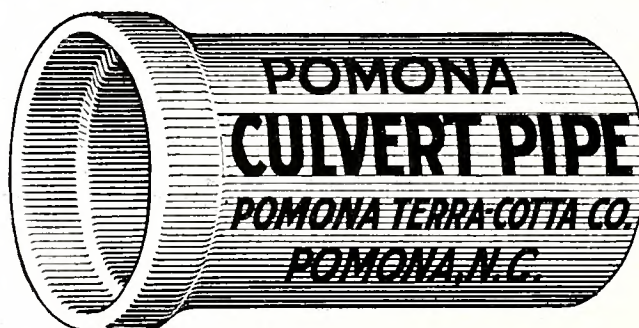
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# SOUTHERN GOOD ROADS

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## North Carolina Good Roads Convention

**Summary of Work Done and Questions Discussed in Great Gathering  
at Wrightsville Beach—More Than a Thousand Delegates  
Registered—President Varner Re-elected**

THE INITIAL SESSION of the North Carolina Good Roads Convention was held in the partially completed auditorium of Harbor Island, Wrightsville Beach, Wednesday morning, June 21st, with President H. B. Varner presiding and more than five hundred delegates from all parts of North Carolina in attendance. The convention was delightfully opened by music by Don Richardson's orchestra and the invocation was delivered by the Reverend Doctor J. M. Wells. Addresses of welcome were delivered by Mayor Thomas H. Wright of Wrightsville Beach, Mayor P. Q. Moore of Wilmington, and Chairman W. A. McGirt of the Board of County Commissioners of New Hanover county.

Mr. H. B. Varner, President of the North Carolina Good Roads Association and Professor W. C. Riddick, President of the Agricultural and Mechanical College of North Carolina, responded to the addresses of welcome. The reports of the Secretary and Treasurer and Director were then read and approved. These reports were in part as follows:

### Secretary's Report.

Dr. Joseph Hyde Pratt, of Chapel Hill, secretary of the Association, made a verbal report, supplementary to his written report published in the August, 1915, number of Southern Good Roads, the official organ of the Association. And Dr. Pratt's report really sounded the keynote of the convention, for it contained the recommendations for the coming year's work, which briefly summarized, include the following:

The vigorous support of the State Highway Commission, and active effort in behalf of securing the necessary legislation to enable that body to carry out the work it plans to do.

The support of the movement for good roads everywhere—beginning with the nation, then the state, then the county and then the township.

The adoption of a strong resolution calling for legislation to prohibit the issuance of bonds for road building unless proper provision is made for the maintenance of the roads to be built.

The publication of a weekly bulletin, or news letter, by the association, for the purpose of aiding in spread-

ing education on road matters, the expense of such a bulletin to be met with money raised by subscription.

The issuance by the association of a road map and route book for the eastern half of the state, similar to the one already issued covering western North Carolina.

Dr. Pratt declared that the support of the State Highway Commission must be one of the main objects of the Good Roads Association. He recalled the work done by the Association in getting through the General Assembly a bill creating the Commission, and pointed out that it is the duty of the association to go before the 1917 legislature and secure for the commission the necessary legislation and financial appropriation to enable it to carry out the important work it has planned.

He referred to the federal highway bill, which has passed the House and Senate and is now before a conference committee at Washington, which contemplates the expenditure of from 25 to 40 million dollars annually by the federal government in road building, such roads to be located only where the states through which they run contribute an equal amount to the amount expended by the government and also make proper provision for the maintenance of the road. The last general Assembly appropriated \$10,000 for the State Highway Commission, and he was of the opinion that no state ever received more from the expenditure of an equal amount than did North Carolina from the expenditure of this, under the direction of State Highway Engineer Fallis.

The association stood for good roads everywhere, Dr. Pratt said. It knew no township or county lines, but is working for the state first. In fact, putting America first, Dr. Pratt declared, this must be the way if one really expresses the spirit of Americanism about which one hears so much today—America first, then the state, then the county, then one's own local community and finally one's own household. Dr. Pratt expressed the hope that the convention would be the means of spreading such a spirit throughout North Carolina.

### To Provide for Maintenance.

He urged the convention to come out with a strong resolution calling upon the legislature for a bill prohibiting a county or township from issuing bonds to build good roads without at the same time providing for the

\*The reporters of the Wilmington newspapers reported the meeting very fully and this summary has been compiled largely from their reports.

maintenance of such roads. The building of modern improved highways without any effort to provide for their maintenance is an economic waste, and the elimination of such a practice would mean a big step forward in wiping out all opposition to the cause of good roads.

A bulletin similar in size and shape to the News Letter issued weekly by the University was what he had in mind as an educational medium for the North Carolina Good Roads Association to work with, Dr. Pratt said, and he hoped the Association would see fit to endorse the idea. Such a bulletin would cost from \$2,000 to \$2,500 for a year, and he was in position to state that half of this amount would be forthcoming provided the association would raise the other half by subscription.

The route book and road maps for the western half of the state, he said, had practically paid for itself with the income derived from hotel, garage and other advertisements. He recommended the issuance of such a book and collection of maps for the eastern half of the state.

Dr. Pratt's report, while verbal and informal, nevertheless gave a splendid resume of what has been accomplished by the Association during the past year and of what is planned for the future, and he was heartily applauded as he resumed his seat.

Treasurer Joseph G. Brown was detained at Raleigh, and Dr. Pratt read his report, which was referred to the auditing committee.

#### Director's Report.

Director D. Tucker Brown, in his report, pointed out that it is not an object of the association to in any way directly raise funds with which to build roads, but rather it aims to promote the cause of good road building through educational means, and to support all worthy movements for the furtherance of good roads building.

The first of the addresses of the afternoon session was delivered by Mr. D. H. Winslow, senior engineer in charge of maintenance of the United States office of public roads and rural engineering, whose subject was the patrol system of maintenance. He told of the workings of the patrol system in the maintenance of the Washington-Atlanta highway, going into detail as to the system as it works out practically, and also into the details of the checking and auditing system used to keep track of the work and its cost.

He also cited the benefits following the inauguration of such a system of road maintenance, pointing out that in the North Carolina link, the past year, it was possible for the first time in the history of the state to go from its northern to southern border in an automobile 365 days in the year without the use of chains or non-skid tires.

Mr. Winslow also told of the use of the color scheme in marking the State and National highways, a very simple and inexpensive, and yet an absolutely efficient way of enabling the tourist to find his way and follow any given road.

He also mentioned that many of the county commissioners of the state have expended money for sign boards for the roads. This was an unnecessary expenditure, he said, as there is a concern in the country which will furnish any county with sign boards for every mile of road it desires to mark. Details as to how these signs may be obtained, he said, could be had on application to Mr. W. S. Fallis, the state highway engineer.

Mr. Winslow, in the course of his remarks, spoke very

highly of the work of Engineer Fallis, and congratulated North Carolina upon the splendid work that the State Highway Commission is doing through Mr. Fallis.

Mr. Winslow's address made a splendid impression upon his hearers, and he was roundly applauded as he concluded it.

#### Dr. Rowe Speaks.

The second of the afternoon speeches was made by Mr. H. M. Rowe, president of the American Automobile Association, of Baltimore, Md., one of the pioneer organizations for boosting good roads. Dr. Rowe told something of the organization and how it has, through its good roads board, lent its support to good roads movements all over the country. His talk, however, was more particularly with reference to the automobile license tax, and what use should be made of it. Inasmuch, he said, as the license tax against the automobile was levied on the assumption that automobile traffic was destructive to roads, then it seemed only reasonable that the money raised through such a tax should be put back on the road for maintenance.

Mr. M. S. Willard, member of New Hanover Board of County Commissioners and former chairman of the board, made a splendid address on the importance of road maintenance. He spoke in part as follows:

"The most important thing to get into the minds of those who are concerned in the building of good roads is the one fact that there is no such thing as a permanent road. Some road engineer answered when asked how soon it would be necessary to commence repairing a good road after it was finished, 'The next day.' There is hardly a day in the year when any specified mile of road couldn't have something done on it to advantage. It may be the cleaning of the ditches, the cutting of weeds alongside, the catching up of some raveled-out edge or the patching of some small hole. But the stitch in time saves the other nine in road building just as effectually as it does in the patching of a partly worn garment.

#### Committees Are Appointed.

Committee appointments were announced by President Varner at the afternoon session as follows:

On nomination and place of the meeting—J. G. Stikeleather, Buncombe; S. L. Webb, Alamance; H. C. Trott, Rowan; W. C. Jones, Guilford; B. Allen, Montgomery; M. F. H. Gouverneur, New Hanover; William Dunn, Craven and R. P. Coble.

Committee on Resolutions—W. C. Boren, Guilford; W. D. MacMillan, New Hanover; W. E. Johnson, Buncombe; W. S. Fallis, Wake; A. M. McDonald, Mecklenburg.

Committee on Membership—R. P. Coble, Ira B. Mullis, J. L. Beeton, P. B. Brown, J. H. Slaughter and N. C. Hughes.

The visitors were entertained with a "few stunts" by the Rotary Club on the beach following the afternoon session. "Hon. Champ Clark" addressed the assembled multitude on the subject of the condition of the country, following which "Governor Locke Craig" introduced "President Wilson," who spoke on the subject of preparedness and peace in general. In the midst of his speech a dozen or more gaily dressed "women" broke up the meeting with their shouts of "votes for women," and were taken summarily by "policemen" and dipped in the briny waves of the Atlantic ocean. The antics of the boosters greatly amused the visitors.

The visiting delegates were made to feel at home that night at an informal "Get Together" meeting at the

Oceanic Hotel, the official headquarters of the convention. Cigars and cigarettes were passed around and everyone made to feel at home.

The Thursday morning session was given over to an examination of the good roads of New Hanover county, the trip being made in automobiles.

#### 200 Cars in Parade.

With 200 automobiles mobilized in the vicinity of Third and Princess streets a few minutes after 10 o'clock, approximately 1,000 delegates and a goodly number of local good roads enthusiasts as guests of the Wilmington Highway Association started on an automobile spectacular parade through the principal streets of the city as a preliminary to a tour of inspection of New Hanover county's splendid system of model highways. Before the tour was ended about 30 miles of the county's improved roads had been covered, and many compliments were paid by the delegates to the fine, smooth boulevards which render every part of the county accessible to the motorist. They were also astonished at their freedom from dust in view of the number of machines in line.

The first stop was at Sunset Park. Here the delegates were lined up along a stretch of highway in need of repair which had been selected for a demonstration of treatment of waterbound macadam with tarvia and

granite chips. The demonstration was given by Mr. W. H. Tourison, of the Barrett Company, of Philadelphia.

President Varner called the afternoon session of the convention to order at 2:45 and introduced Chairman W. A. McGirt, of the New Hanover Board of Commissioners, who presided.

The first talk of the afternoon was made by Dr. Joseph Hyde Pratt, State Geologist and secretary of the North Carolina Good Roads Association, who made a brief but interesting talk on the economic use of convicts in road construction. In beginning his remarks Dr. Pratt emphasized what he considered should be the attitude of the state and county toward the unfortunates who are convicted and sentenced for crime, and, he observed, what he had to say applied to black as well as white.

He spoke briefly of the experiences of several counties in handling small groups of convicts on the roads by means of the honor system, whereby they had been able to work the men to good advantage without the expense of hiring guards. The experiences of many of our counties, he said, showed that it was economical to build roads with convict labor.

Dr. Pratt closed by declaring that he wanted to see all of North Carolina's convicts worked on North Carolina roads. He suggested that in counties where there



Paving Brick Stand the Storms—Washout Along Killbuck Creek, Near Wooster, Ohio

are only a limited number of convicts, it might be well for two or more counties to pool issues and maintain one convict camp, bearing the expense proportionately and working the gang in one county for a given time, and then in another.

#### **Forsyth's Concrete Roads.**

Mr. James Gray, chairman of the road commission of Forsyth county, told the convention of the concrete roads recently adopted by his county for the roads subject to heavy traffic conditions and on the approaches to the principal city, Winston-Salem. This step, he said, followed the discovery that the growing traffic made both water bound and bituminous bound macadam unsatisfactory. He stated that the concrete roads are expensive if let out to a contractor, but if built with convict labor, can be constructed economically.

Dr. Chas. T. Nesbitt, superintendent of health for New Hanover county, made a very interesting address on the care of convicts from the standpoint of health and sanitation. In beginning he observed that he had always thought the methods of punishment sanctioned by our civilization are wrong, in that any punishment that humiliates a man only served to pile up his grudge against society. The aim should be to turn him free after serving his sentence a better man both physically and morally.

At least 99 out of 100 convicts, he said, came into the camps deficient physically, and this condition required correction also. They must be broken from their old habits, educated up from vermin and vicious habits and made to appreciate the benefits of cleanliness and right living. He told of the methods followed in treating the New Hanover convicts and stated that it usually required two or three weeks to put a convict into condition for efficient service on the roads.

#### **Pictures Are Presented.**

Major Jos. W. Little made the presentation of handsome framed group pictures of New Hanover's good roads to the delegations from Pender, Onslow, Sampson, Duplin, Bladen, Columbus and Brunswick counties. These handsome groups, each containing seven large photographic reproductions of scenes on New Hanover's improved highways, were given by the Wilmington Highway Association, and Major Little, in presenting the pictures on behalf of the association, congratulated each of the neighboring counties on the interest and progress it has made in road building, and expressed the hope that the pictures would be a source of inspiration for still further effort in behalf of improved roads.

The delegations from the receiving counties cheered the presentations, and mention of the Wilmington-Fayetteville, Wilmington-Goldsboro and Wilmington-Charlotte highways evoked storms of applause, though probably the biggest demonstration came from the Brunswick delegation when Major Little, in presenting the picture to that county, spoke of the need for a modern bridge across the Cape Fear, connecting New Hanover and Brunswick.

The pictures will be hung in the court houses of the different counties.

#### **Automobile Tax.**

Mr. W. D. MacMillan, a member of the New Hanover Board of Commissioners and president of the Wilmington Highway Association, made a short but interesting talk on the automobile tax and the use it should be put to. He advocated legislation to enable all funds raised through the automobile tax to be expended upon the

roads of the state through the State Highway Commission, and expressed the hope that the association will lend its support to a campaign to secure such legislation from the next legislature. He mentioned that there are more than 25,000 automobile owners in North Carolina today, and that the money raised from the license tax on these machines would amount to \$125,000.

Dr. Pratt, in a short discussion of state highways, voiced the opinion that if automobiles are taxed because they are hard on the roads, then a special tax should be levied upon traction engines, which do far more damage to the highways than automobiles.

#### **The Evening Session.**

Easily the most pleasing feature of the night session was the singing of Miss Anna Graham Harris, daughter of Mr. and Mrs. J. F. Harris, of Wilmington, who rendered several solos during the early part of the session. Mr. William G. Robertson, organist at St. James' church, Wilmington, was the accompanist.

The first address of the evening was by Hon. O. L. Evans, president of the Virginia Road Builders' Association, who discussed the importance of State Highways and told something of the experience of his own state in building and maintaining such roads.

Mr. G. Herbert Smith, of Acme and Wilmington, who had for his subject the importance of State Highways and their bearing upon North Carolina's gateway port, made one of the most interesting and eloquent speeches of the convention. He declared that he wished to emphasize to North Carolina the importance of having all state highways lead to Wilmington, because thereby will be built up a great port—something that the state is badly in need of.

The final feature of the night session was the reports of the committees on the various North Carolina Highways. Senator Rivers D. Johnson, of Warsaw, and Hon. Geo. B. Elliott, of Wilmington, made the report for the Wilmington-Goldsboro Highway; Hon. J. M. Vann, of Monroe, reported for the Wilmington-Charlotte Highway; Maj. Geo. E. Butler, of Clinton, reported on the Wilmington-Fayetteville Highway; Mr. Leonard Tufts, of Pinehurst, on the Capital Highway; Hon. Jas. A. Gray, of Winston-Salem, on the Winston-Salem-Bristol, Tenn., Highway, and Mr. W. L. Mann, on the Charlotte-Pinehurst-Raleigh Highway.

All of the committees reported progress on these highways, and a splendid outlook for results during the coming year. Senator Johnson reported that the Goldsboro-Wilmington Highway was in fair shape for travel with the exception of one stretch of about 13 miles of sand road. Mr. Vann reported the Charlotte-Wilmington Highway as a series of links of very good road but still lacking through connection. Union and Anson counties need to complete their part of this highway before it can be in really fair shape. Major Butler reported progress in the plans for the Wilmington-Fayetteville Highway, with prospects for some good work toward the realization of these plans in the near future. Mr. Tufts reported that the Capital highway would be complete ere another winter. The worst stretch, that between Fredericksburg, Va., and Washington, will be improved before that time, he said. Mr. Gray reported the Winston-Salem-Bristol highway in fair shape except for one line. Mr. Mann reported that the Charlotte-Pinehurst-Raleigh Highway is as yet mostly a project, but one that bears all promise of being carried out to a successful conclusion.

#### **Friday, June 23—Morning Session.**

Considered from the standpoint of practical informa-

tion on road building and allied subjects. Friday morning's session was probably the most interesting of all, for the addresses heard were by experts, and packed with information of much value to the road builders who listened to them most attentively.

President Varner called the convention to order shortly after 10 o'clock and the invocation was delivered by Rev. M. T. Plyler, of Wilmington. President Varner then introduced Mr. W. C. Boren, chairman of the Board of Commissioners of Guilford county, who presided.

The first address of the morning was by Mr. Leonard Tufts, of Pinehurst, one of the pioneer road builders of North Carolina. Mr. Tufts told of the early efforts at road building in this state, and how the first roads built, without provision for maintenance, depreciated very rapidly. He then went into an analysis of the question of what kind of roads to build, and stated that no matter how expensive the road, there will always be the bugbear of maintenance, and the more expensive the road, the more it will cost to maintain it.

Cost of maintenance, he said, has been demonstrated to amount annually to 10 per cent of the original cost of surfacing a road. These figures are fairly accurate, he declared, and are borne out by the experience of his own county—Moore. A road that cost \$1,000 a mile will usually cost \$100 a year to maintain.

One of the principal differences between the expensive and the cheap road, Mr. Tufts declared, is that

the cheap road must usually be maintained every month out of the year, while the expensive road may sometimes go several years before the expense of maintenance begins.

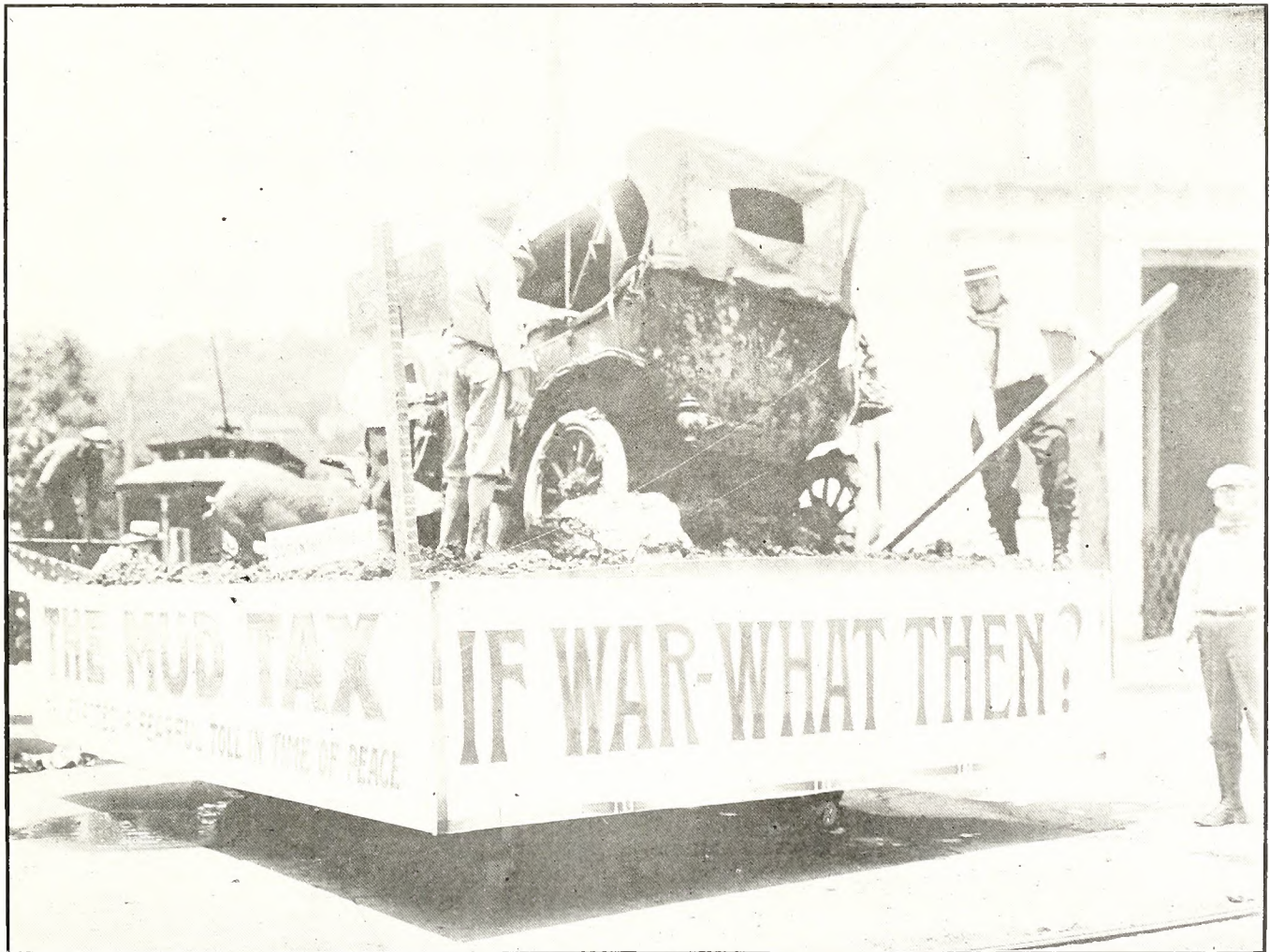
### Sand-Clay Roads.

The sand clay roads in Moore county, said Mr. Tufts, cost to build from \$300 to \$500 a mile, and to maintain from \$30 to \$50 per mile per year. However conditions there were advantageous to the construction of cheap highways, and such roads served the traffic of the section excellently.

The discussion of the subject of Federal aid was opened by Mr. C. A. Kenyon, director of the American Highway Association, of Indiana, who delivered a most interesting and instructive address. In beginning he remarked that he much preferred a roads convention to a political convention—that he disliked politics when it comes to road matters on account of the fact that politics has and is still interfering to some extent with the solution of the problem of road betterment.

"It is all right to be prepared for war," said Mr. Kenyon, in closing, "but it is better to be prepared for peace, and what better preparation can a country have for war or peace than good roads."

Mr. J. E. Pennybacker, of the United States Office of Public Roads and Rural Engineering, followed Mr. Kenyon with an interesting and practical talk on some phases of the road work the federal government is al-



THE SLAVERY OF THE MUD TAX  
Exhibit of Dixie Highway in Preparedness Parade at Nashville, Tenn.

ready doing. He remarked that it was a pleasure to attend a road convention with 1,000 delegates in attendance for such an attendance was truly eloquent of the deep interest of the state in the road improvement problem.

Americanism should be the spirit with which Americans look upon road building, said Mr. Pennybacker, and he defined Americanism as simply a broadening of the spirit of neighborliness, the promotion of which is one of the fundamental aims of road building.

Another factor to be taken into consideration, he said, is that roads must be built as functional things, not as physical things. The traffic to be carried must first be considered, and not the points to be touched.

"Good Roads and Preparedness" was the subject of a most interesting and timely paper by Hon. E. A. Stevens, president of the American Road Builders' Association and State Commissioner of Public Roads for New Jersey.

Colonel Stevens, who is State Commissioner of Public Roads, of New Jersey, gave some interesting figures showing roughly that while North Carolina has six times the area of New Jersey with a population ten per cent. less and a road mileage three times as large the motor registration shows that there are only one-fourth as many machines in North Carolina. He explained that improved road development in New Jersey had been entirely along the lines of State aid extended to local communities, with the greatest regard being paid to local-government. The demand for good roads, however, increased to a greater extent than the legislatures were willing to meet in appropriations and it, therefore, became necessary to allow the counties to build roads entirely on their own means which is the position today. However, this has been far from satisfactory, said Col. Stevens, because it has been difficult to secure any continued policy of road improvement.

Mr. O. E. Wilson, chairman of the Good Roads Committee of the North Carolina Division of the Travelers' Protective Association, delivered a brief but instructive talk, on the need for a more general use of sign boards on our public highways.

He was followed by Maj. W. A. Graham, State Commissioner of Agriculture, whose reminiscences of the early days of road building proved most interesting to the convention.

#### **Federal Aid Endorsed.**

Immediately following the conclusion of the speeches for the morning, the convention unanimously adopted a resolution endorsing the Federal Aid bill now in Congress and authorized the secretary to telegraph copies of the resolution to Senators Simmons, Overman and Bankhead and to Representatives Kitchin and Shackelford.

#### **Afternoon Session.**

The following are resolutions adopted at the closing session of the Good Roads Convention Friday afternoon:

"Whereas the automobile tax which is paid into the State Treasury, 80 per cent. of which is returned to the counties for use on the public roads, the law stating that said tax may be used for the construction of roads; and,

"Whereas in view of the fact that when each country receives its prorated part of this tax the amount is too small to be used effectively for construction purposes; and,

"Whereas travel in automobiles has become inter-county and state-wide in character; and,

"Whereas this association favors the construction and maintenance of continuous roads beginning somewhere and ending somewhere; and,

"Whereas the Federal government will in all probability, at the present session of Congress make appropriation for Federal aid to States which will be conditioned: First, upon the state's appropriating dollar for every dollar of Federal money expended in that State; second, upon the expenditure of this money being through the office of the State Highway Commission; third, upon the construction of roads, the location, construction and maintenance of which are approved conjointly by the State and Federal Department; and fourth, upon the guarantee from the state, county or sub-division of government that the roads so constructed shall be maintained under the direction of and to the satisfaction of the Secretary of Agriculture; and,

"Whereas we favor the construction of a system of highways, we therefore favor the maintenance of that system of highways; and in order to do this, it is necessary that funds be made available to be expended under the direction of a central authority such as the State Highway Commission and the Federal government; and,

"Whereas automobile traffic is not of a local nature, the fund derived from this tax is the most logical one for beginning such a state system of maintenance;

"THEREFORE, BE IT RESOLVED that the North Carolina Good Roads Association in convention assembled, go on record as favoring such action on the part of the General Assembly of North Carolina as will make the funds received from said automobile tax or an equivalent amount thereto from the general funds, except a sufficient sum to cover the cost of issuing the license tags, available for the maintenance of a system of State or inter-county highways, to be apportioned in an equitable manner.

"Whereas it is a frequent occurrence for counties and townships in the State to issue bonds for road construction without providing funds for the maintenance of these roads when constructed;

"Be it resolved by the convention that we recommend the passage of a law by the next General Assembly providing that in issuing bonds for road construction by counties or townships adequate provision shall be made for a fund sufficient to efficiently maintain the roads constructed under the bond issue."

#### **Favors Road Signs.**

"Resolved that the North Carolina Good Roads Association favors the placing of road signs at every point on the public roads of the State where such signs would be of value to the traveling public."

#### **Use of Narrow Tires.**

"Whereas we recognize that the narrow tires so commonly used on the roads of the State are doing incalculable injury to these roads we recommend the passage of a State law by the next Legislature to regulate the width of tires that may be used on the public highways of the State."

"Resolved that the Association expresses its appreciation of the co-operation received from the U. S. Office of Public Roads and Rural Engineering in detailing two of its officials to address this convention."

"Whereas, we, the members of the North Carolina Good Roads Association, have observed closely the work of the North Carolina State Highway Commission

for the past year and a half and are convinced and confident that it has been of great service to the State, even greater than the most optimistic and hopeful could have looked for under the small appropriation allotted by the last legislature; and,

"Whereas we believe and know that the last legislature in establishing a highway Commission passed a most important piece of constructive legislation; and,

"Whereas the work of the State Highway Commission will be very much handicapped if sufficient funds are not made available by the next legislature:

"Therefore be it resolved that we, the members of the North Carolina Good Roads Association, do most heartily recommend and favor an increased and adequate appropriation for the work of the State Highway Commission."

#### **Geological Survey.**

"Whereas the North Carolina Geological and Economic Survey has always taken a leading part in impressing upon the people of the State of North Carolina the importance of better roads; and,

"Whereas the North Carolina Geological and Economic Survey has lent its heartiest support to all efforts for the betterment of road and other conditions in North Carolina:

"Therefore be it resolved that we, the members of the North Carolina Good Roads Association, do most heartily endorse the work of this department."

#### **Endorse Institute.**

"Whereas the North Carolina Good Roads Institute held regularly at Chapel Hill, North Carolina, under the auspices and direction of the State Highway Commission, the University of North Carolina and the North Carolina Geological and Economic Survey, is doing a great work in instructing and disseminating knowledge among the road officials of the State;

"Therefore be it resolved that we, the North Carolina Good Roads Association, most heartily endorse the work of the North Carolina Roads Institute and earnestly recommend that all the road officials of the State attend the sessions of this institute."

#### **Convicts For Roads.**

"Whereas the State of North Carolina has many able-bodied men in her penitentiary who could be made available for the construction and maintenance of a road system; and,

"Whereas, the prisoners, if put on the public roads would be a most valuable asset to the State; and,

"Whereas the prisoner has, in his action committed a crime against society, full reparation for which may be made by his work for the public, where he will not come in competition with other labor; and,

"Whereas, such work as is required upon public roads is conducive to the health and comfort of the prisoners; and,

"Whereas, the duty assigned to prisoners at work on the construction of public roads more or less fits them for maintenance service after the expiration of their terms; and,

"Whereas, constant employment is a pre-requisite to good citizenship, and it is so difficult for a discharged prisoner to secure such employment.

"Therefore be it resolved that the North Carolina Good Roads Association favors the working of all the State's prisoners (having no reference to county prisoners) on the construction and maintenance of a system of public roads; and we also favor a system such

as is in operation in the State of Virginia where the superintendent of the penitentiary has entire charge of the conduct, feeding, and clothing of prisoners and the State Highway Commission has charge of directing the work that they shall do."

#### **Resolution of Thanks.**

"Whereas the City of Wilmington extended a most cordial invitation to the North Carolina Good Roads Association to hold its annual convention at Wrightsville Beach, and as the North Carolina Good Roads Association has, through the efforts of the people of Wilmington and New Hanover county, held the most successful and enthusiastic road convention of its history.

"Therefore be it resolved that the North Carolina Good Roads Association expresses appreciation to the Board of County Commissioners of New Hanover county, the press of the State, the railroads of the State, the Wilmington Chamber of Commerce, the Rotary Club and the various individuals and companies who have so generously contributed their time and money and enthusiasm to the success of the convention."

#### **Prizes Are Awarded.**

The awards of prizes to the towns and cities with the best attendance records for the convention was an interesting feature of the afternoon session. These prizes were awarded on a basis that figured the number of delegates in attendance in proportion to the number of inhabitants of the community represented, as well as the distance traveled in reaching the convention. Dr. Joseph Hyde Pratt announced the awards as follows:

County First Prize—Cherokee, with ten delegates, a silver cup.

County Second Prize—Swain, with six delegates, six links of metallic culvert.

Sampson county stood third in this contest, with a total of 116 delegates the largest registration of any visiting counties. A special prize—one of the United States Highway Association's maps—was awarded Sampson.

The award for the automobile making the longest trip to the convention went to two, Bryson City, Swain county cars, one owned by Dr. R. E. Bennett and the other by W. W. Wheeler. They were awarded a handsome silver cup and each car was also given one of the American Highway Association's eagle emblems to be worn on the radiator of the car.

For the best display showing what a county has done in the way of road building, Lee county was awarded first prize, 20 feet of 60 inch culvert.

Guilford county was second in this contest and Swain third.

When it came to the cities, the "far west" won out again, Andrews, Cherokee county, taking first prize, two iron road signs; and Bryson City, Swain county, coming out second. Albemarle, Stanly county, was third.

A prize was offered to the Board of trade or other commercial organization having the largest delegation in attendance, but as no organization put in a claim for this the committee gave the prize to the Wilmington Chamber of Commerce, in recognition of its efforts in behalf of the convention. The prize was a road map issued by the Nation Highway Association and one of the association's eagle emblems.

A prize was awarded the Woman's Club of Salemburg, for having the largest representation of any club or association. This enterprising organization which has been largely instrumental in almost completely

revolutionizing the community life of that progressive place sent ten accredited representatives in addition to others who came to the convention.

#### Election of Officers.

The election of officers was made unanimous upon the report of the committee on nominations and the place of next meeting, submitted by Mr. J. G. Stikeleather, of Asheville. The officers elected are as follows:

President—H. B. Varner, (re-elected).

Secretary and Treasurer, (two offices consolidated)—Joseph Hyde Pratt.

Assistant Secretary—Miss H. M. Berry.

Vice-presidents—One from each congressional district, as follows: First, G. D. Canfield; Second, M. O. Howard; Third, Geo. C. Royal; Fourth, Geo. L. Jones; Fifth, W. C. Boren; Sixth, W. D. MacMillan, Jr.; Seventh, S. P. Hatch; Eighth, E. E. Gray; Ninth, A. M. McDonald; Tenth, F. Stikeleather, Sr.

Asheville was recommended as the place for the next annual meeting. The actual selection of a place was left, however, to the executive committee.

## Big Increase in Motor Traffic

### Short Story of An Industry That Has Shown Five Thousand Per Cent Growth in Ten Years

IN 1905, there were 48,000 motor cars, including commercial vehicles, in the United States, according to the registration statistics assembled by the Division of Road Economics of the United States Office of Public Roads and Rural Engineering; in 1915 there were 2,445,664. This was an increase of five thousand per cent. Ten years ago of the expenditures on account of the building of rural roads and bridges in the United States less than three-tenths of one per cent was derived from the tax on motor vehicles; last year nearly 7 per cent of the money available for this purpose was derived from this source. In 1901 the first revenue derived by any of the states from automobile revenues was collected in New York state and amounted to only \$954. Other states followed the example of New York, requiring the registration of motor cars, chauffeurs and operators, until in 1905 the total amount collected in all the states on this account aggregated \$62,500; last year the revenues from this source amounted to \$18,245,713. In nearly all the states practically 90 per cent of the motor car revenues was applied in 1915 to road work and 70 per cent of this sum was expended under the control and supervision of the State highway departments. In forty-two states all, or a large part, of the revenue from motor cars must be expended for the construction, improvement or maintenance of the public roads, or for the maintenance of the State highway departments. In six states this requirement is not made.

In 1915 the total number of motor vehicles registered in the United States was 2,445,664. The total road mileage in the United States outside of incorporated towns and cities is approximately 2,275,000 miles. This would mean that there is slightly more than one motor car for each mile of rural road in the United States, if the distribution of the car from uniform for all the states; but it is not, as in the State of Nevada there is one motor car for every six miles of rural road, and in New Jersey six motor cars for every mile of rural road. In the United States there is one motor car registration for every forty-four persons, in the State of Iowa there is one registration for every sixteen persons and in Alabama only one registration for every two hundred persons.

There is no uniformity in the fees required of motor vehicles, and there are wide differences in the requirements for the registration or licensing of chauffeurs, owners and operators. The tendency is growing to base the registration fees for pleasure cars on straight

horse power; for commercial vehicles the tendency is to require a part of the fee on the horse-power of the car and the remainder of the fee either on the carrying capacity of the vehicle or on its weight. The average fee of the motor cars in the United States, taking them by and large, is estimated at \$7.46. Reckoning on the same basis, the State of Vermont received in 1915 a gross revenue of \$18.10 for each car while Minnesota received only about fifty cents annually for each car, the registration in that State covering a period of three years. In Texas and South Carolina no annual registration fees are collected, the only requirement being a county fee of fifty cents and one dollar respectively for what is called a perennial registration. Many states make no distinction so far as the registration records go between pleasure and commercial cars. A few states register all motor vehicles, including motor cycles, under a single class; in some states the registration of motor cycles is not required.

The enormous increase in motor car traffic is bound to affect favorably the condition of the public roads of the country as the number of cars and the revenues increase. In the good old patient days when the horse-drawn vehicle was the only means of transportation in the rural districts and time was no object to the people, who took things as they were, it did not seem to matter very much how many holes and ruts and swampy places there were on the roads to market; but it is different now and the motor cars are making smooth and substantial highways necessary to their favorable progress and to the success of business. It is worth noting that from the time of the old Cumberland highway surveyed by Washington and built by the National Government it was not until the automobile had come and proved its practical value as the greatest burden bearer of the centuries that there was any serious thought of inter-state and trans-continental highways that would hold the country together in the closest neighborhood. It was not until wise men at the Capitol discovered the rural free delivery postal routes, that a constitutional way was found to make the government at Washington an active partner in the enterprise of building good roads for the health of the nation.

The Motor Car Bulletin prepared by the United States Office of Public Roads and Rural Engineering is a most suggestive and interesting contribution to the good roads literature on the subject.

## Preparedness Road Parade

**T**HE part the construction of permanent roads should play in the Preparedness Program was emphasized in a good roads exhibit of three floats entered by the Dixie Highway Association in the big Preparedness Parade held in Chattanooga, Saturday, June 3rd, under the auspices of the Chattanooga Auto Club.

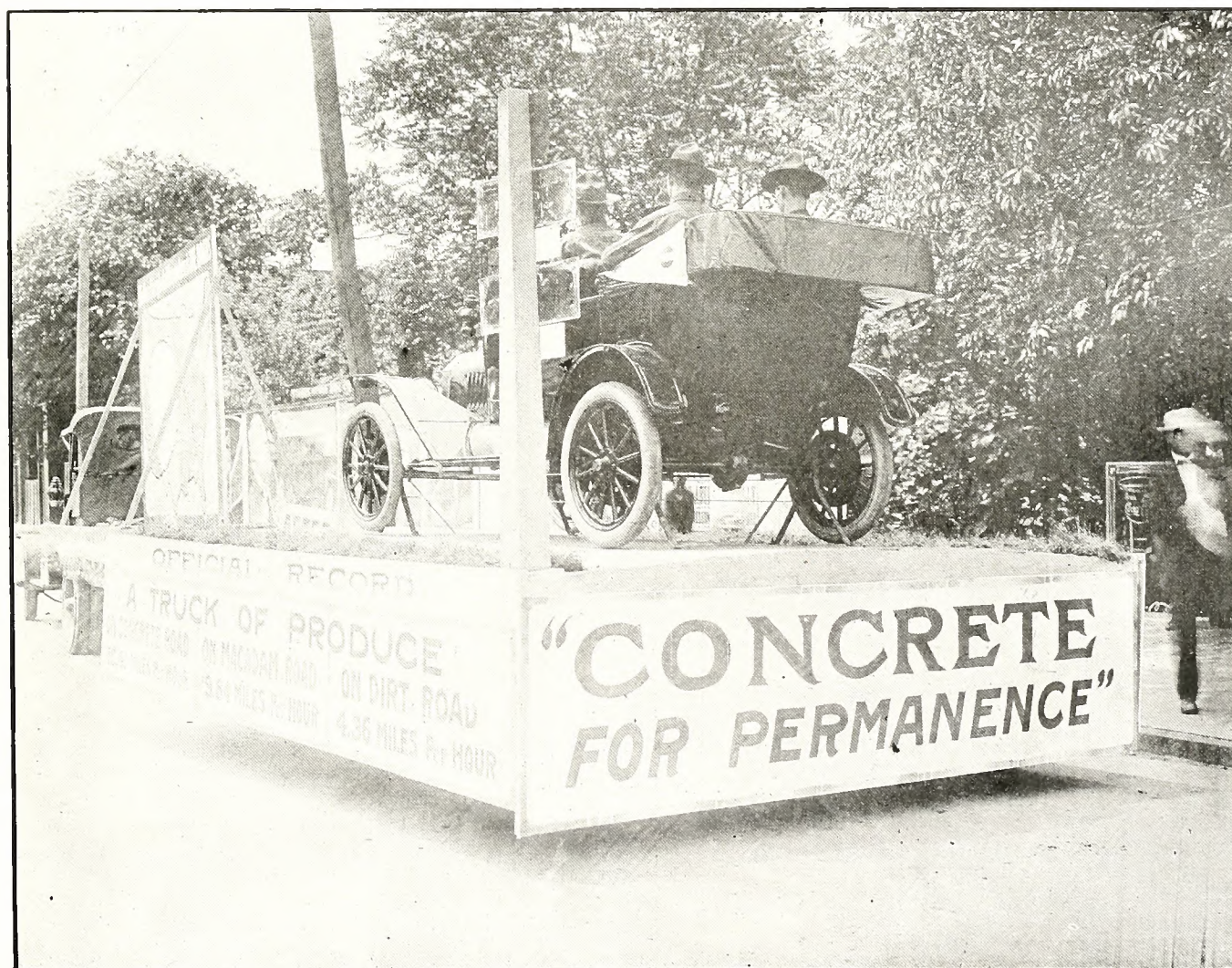
On the first float, a section of impassable country road twelve feet wide was reproduced with such realism that every automobile owner, familiar with a country road, immediately recognized it. A Ford car was mired hub deep in the mud and the logging committee of the Chattanooga Automobile Club composed of Ernest Holmes, W. B. Bender and C. E. Kirkpatrick with fence rails were endeavoring to get it out. Judge M. M. Allison, president of the Dixie Highway Association, was at the wheel, and throughout the entire parade kept the only wheel of the car which could move, spinning around in the rut. A hog rooting in the mud and two school boys with their books under their arms, wading through the muddy roads, completed the picture. On each side of the float appeared the words, "The Mud Tax has Enacted a Fearful Toll in Times of Peace," while on the rear was the inscription, "If

War, What Then?" The careful attention to detail was shown in the old faded sign boards identifying the location of the road between Nashville and Chattanooga.

The next float showed a large map of the United States, with the Lincoln, Dixie and proposed border Highways, labeled "The Basic Principle of All Preparedness is GOOD ROADS."

The third float, which completed the series, showed a model concrete road twelve feet wide. Traveling over this road, with the wheels spinning, was a new Ford car, carrying five soldiers with guns. Grass was growing on the side of the road. Concrete sign posts with handsome enameled Dixie Highway and location signs marked the road. On each side of this float was shown, condensed, the record of the official test made with a federal two ton truck load of produce over concrete, macadam and dirt roads. On the back of the float was the legend "CONCRETE FOR PERMANENCE."

The good roads exhibit was designed and entered by V. D. L. Robinson, secretary of the Dixie Highway Association. It was awarded the first prize of \$75.00 offered for working out the best suggestion on preparedness.



MODERN HIGHWAY EXHIBIT

Shown in Dixie Highway Preparedness Parade at Nashville, Tenn.

# Maintenance In North Carolina

## How a Southern State Is Turning to the Conservation of Highways Already Built

ON the maintenance of roads the state of North Carolina is making great strides. For three years a maintenance corps has been regularly traveling back and forth over Washington-Atlanta Highway in North Carolina from one point to another, directing and supervising the maintenance work in the counties through which this route passes. Recently a second route was inaugurated on the Central Highway of North Carolina, beginning at Morehead City and crossing the state through the following counties: Carteret, Craven, Lenoir, Wayne, Johnston, Wake, Durham, Orange, Alamance, Guilford, Davidson, Iredell, Catawba, Burke, McDowell, Buncombe and Madison. An alternate route through Forsyth and Davie counties has been provided. For the present the western terminus of the route will be in Burke county, on account of the bad roads between there and the Tennessee line. This work, however, will be taken up a little later on.

This maintenance system is a cooperative movement between the United States Office of Public Roads, the State Highway Commission and the county commissioners through which the various roads run. The government furnishes two engineers, the state the transportation and the county commissioners furnish the labor, which is worked under the direction of the engineers. The initial party, which covered the route from the Atlantic Ocean to the country of high altitudes, is as follows: E. W. James, Chief of the Division of Maintenance of the Office of Public Roads; D. H. Winslow, North Carolina Government Engineer; Dr. Joseph Hyde Pratt; W. S. Fallis, state engineer. With two of the main highways traversing the state under the patrol and maintenance system, North Carolina is giving an object-lesson in the upkeep of its roads that other states in the country could well learn. Mr. Fallis stated that travel had been possible over the Washington and Atlanta Highway through this system for 365 days in the year without either chains or nonskid tires being necessary. The new route will soon be put in just as good shape within a much shorter time than was necessary over the old route. Experience has taught both the engineers and the commissioners much about keeping the good roads in good shape.

State Highway Engineer Fallis, in speaking of the good roads activity, gave the following detailed information about recent good roads work in various counties over the state:

In Sampson county there has been recently built about eight miles between Clinton and Faison. New road building equipment has recently been bought.

Lovelady township, in Caldwell county, has graded and topsoiled three miles of road. A \$3700 bridge has been completed over Gunpowder Creek.

Cabarrus county, with four squads of laborers, has put in good shape 18 miles of road.

Cleveland county voted and sold \$40,000 worth of good road bonds.

Columbus county has bought new equipment, and several new sections of the Wilmington, Charlotte and Asheville Highway have been constructed and connected up, making about 60 miles of good roads in the

county. Several tributary links are being built to these highways.

About seven miles of the Yadkin road, leading from Fayetteville, in Cumberland county, to the Hoke line, has been completed. This is of sand-clay construction.

Hoke county is to build a road to the line to meet the Yadkin road. This county now has about 250 miles of improved roads out of the 480 in the county.

Davidson county is building from 200 to 250 miles of natural soil roads as a result of a recent bond issue of \$300,000.

In Franklin county a bridge has been built in Louisville.

A concrete highway is under construction in Guilford county from Greensboro to High Point, a distance of 15 miles.

Six townships in Harnett county have voted in the aggregate \$90,000 recently, and the money is now being spent on good roads.

There are five townships in Pitt county which have voted a total of \$50,000 for good roads.

On the Charlotte to Wilmington route, in Richmond county, a road is being built to connect the Ferry road with the road in Anson county. By this connection a shortening of the distance of about 30 miles has been effected.

From Salisbury to Woodleaf in Rowan county a sand clay road is being built.

Work has begun on the Salisbury-Albemarle road and the Charlotte-Pinehurst road is being surveyed.

### Great Road Decade Ahead.

"Another ten years will see national road systems covering every section of the country—the greatest practical step in the direction of preparedness that could be made," comments Dr. H. M. Rowe, the newly elected president of the American Automobile Association.

"In a decade we will begin to have separate roads for freight traffic and passenger traffic," predicts Dr. Rowe, "and the horse and mule will have practically disappeared. No other country on the face of the earth can make such good and profitable use of good roads as the United States of America. We will eventually excel in that as we do in many other things.

"But equal justice and fair treatment, for the users of motor vehicles must continue to be sought for some time to come. Everything the motorists ask for, everything the American Automobile Association and the clubs affiliated with it have worked for, has been based on these principles. We have worked for good roads for the reason that they are of equal economic benefit in the final analysis to all, and it is only just and right that the people of our country should have the advantages to which they are entitled. We have worked for unrestricted intercourse between the states through the use of motor cars, because that is a constitutional right that has been denied us. We have asked for equal taxation. That is another constitutional right that has been set aside, partly because we submitted to it will-

ingly, I admit, but it is an injustice and constitutes unfair treatment just the same.

"In addition, the owners of motor cars are being subjected to all sorts of petty annoyances; special taxes, licenses, and rules and regulations regarding traffic, use of light, and many restrictions seldom alike in two places, and which subject decent men and women to arrest and conviction, often for the most trivial reasons. There are many who look upon an arrest of any kind as a disgrace, and when one is innocent of any intentional wrong, his arrest becomes a shameful disgrace, not only to him but upon the community which permits it."

#### Put Markers on Central Highway.

Mr. D. H. Winslow, U. S. superintendent of road construction, has been inspecting the Central Highway, of North Carolina, which has been officially turned over to the U. S. Government and will now be under government supervision.

Mr. Winslow is trying to urge the counties to mark the Central Highway so that tourists will have no trouble in following the route. The official marker for this road will be a blue, a white, and a red stripe, which will be painted on mail box posts and other objects along the road. He also wants to get the towns to have these markers so that tourists will not encounter difficulty in passing through.

Mr. Winslow has under his supervision the National Highway from Washington City to Durham and the Central Highway from Durham to Morehead City.

He states that he is well pleased with the progress that is being made on the Central Highway, and he is going to endeavor to get Lenoir county to construct its link between Craven county line and Kinston, as this is now about the worst piece of the road in the entire highway.

The United States Government is now aiding the counties in good road construction. The government pays half the cost where the roads are officially under government supervision.

#### National Park Highway Open.

A direct, short-line connection, termed the Salt Lake-Yellowstone highway, between the Lincoln highway, Midland Trail and Pike's Route to the Pacific coast, at Salt Lake City and Ogden, Utah, the Yellowstone national park, and all points in northwestern United States, is now open to auto traffic to within a few miles of the national park. The remainder of the route will be opened to travel coincident with the granting of permission to the entrance of cars in Yellowstone, about July 15.

The highway is built on a water grade and passes between the Wataah Range and the Great Salt Lake in Utah, northerly through the Cache, Malad and Bear Lake valleys in Idaho, to Pocatello, Idaho. The Idaho-Pacific or Oregon Trail branches at this point northwesterly through the watershed of the Snake and Columbia rivers to Spokane, Seattle and coast points. From Pocatello, north to Yellowstone park the highway traverses the upper Snake river valley on the same water grade over the Captain Bonneville Trail to a point near the western border of the park, and then skirts the park to the western entrance at Yellowstone, Montana.

Approximately \$5,000 has been spent in the construction of the highway. A larger number of small road

associations have been working for the past eight years toward its completion. Several years ago it has designated a part of a joint system of state highways by the highway commissions of Utah and Idaho, and the major part of the construction work achieved with state and county aid. Early in 1916 these smaller organizations met with the county commissioners along the route and the two state highway commissions and formed the Utah-Idaho Yellowstone highway association, for the state purpose of completing a few unfinished sections, doing general repair work, shortening the route in several localities, making the highway from the Great Salt Lake to Yellowstone park first-class and continuous for use this year, and maintaining and patrolling it throughout the season.

The Salt Lake-Yellowstone highway not only furnishes an outlet for park bound traffic of the Lincoln highway, Pike's peak route and Midland trail from California and eastern United States at Salt Lake and Ogden, and for traffic off the northern routes into the park and out of the Yellowstone entrance, bound for the northwest (branching at Pocatello, Idaho,) and California and eastern points via Ogden and Salt Lake, but it is the only direct north and south connection between these central western and northern routes in the Rocky mountain region.

All of the beautiful scenic mountainous sections of Utah and Idaho lying contiguous to the Yellowstone national park are reached by this main highway and auxiliaries.

It also serves as the main trunk highway and basis of a general scheme of connecting county road systems in the seventeen counties of the two states along the route.

#### Build Roads Into Mexico.

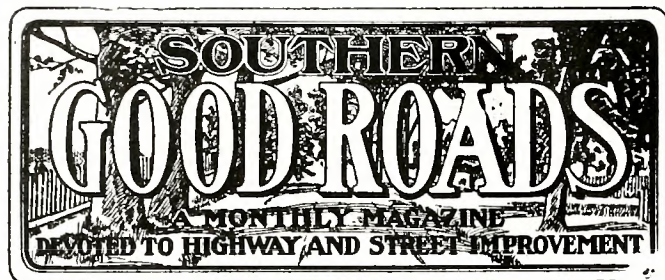
Telegraphic requisition came to Maj. William Elliott, army depot quartermaster in El Paso, Texas, recently from officers of the engineering corps attached to the punitive expedition commanded by Brig. Gen. John J. Pershing for large quantities of road making and road grading machinery of several kinds, presumably for use by the engineers in constructing roads from the army supply base at Columbus, N. M., into western Chihuahua before the rainy season in that state begins. Major Elliott forwarded the requisitions to the department quartermaster at Fort Sam Houston for approval.

Quartermaster Elliott said the requisitions called for scrapers, plows, dump wagons, road rollers, as well as lumber, cement and other materials used in road building and bridging streams. He will make the wants of the army known to El Paso dealers, but intimated that the orders would be of such quantities that it was probable the orders for the machinery would be placed with eastern manufacturers or jobbers.

Maj. Elliott said that the so-called commercial freight shipments of his department over the Mexican railroads to the army in Chihuahua had been very few, and that the great bulk of freight was still being sent by motor truck trains from Columbus.

Vermilion county, Illinois, road supervisors expect to have everything in readiness to begin the construction of the \$1,500,000 road system for the county by May 1.

Reports from seven Mississippi counties indicate that the work on the Jackson Military Highway in that state will be complete by June 1.



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**KEEP A GOOD ENGINEER.**

No county that engages in a real road building campaign can afford to dismiss its corps of engineers just as soon as the bulk of the construction work is done. Fact of the matter is the engineer's work is just then well under way. In the matter of maintenance his advice is of the highest importance, for it is certainly as important that the work of saving what has already been done in a wise manner, as to do it wisely. Again it rarely ever happens that the initial work is done so wisely but that there are little things that could later be added that would help immensely. In the matter of building roads containing many curves, for instance, it is highly important that these curves be properly banked. It is the hardest sort of a proposition to get this properly done during construction. The outside of these curves is usually a fill and they may look high enough to the contractor, but they soon settle and become a source of danger to motor traffic. An engineer should be on hand to look after these things, as well as a hundred other problems that constantly arise. There are myriad things that should be done and done quickly, if roads already built are to do their fullest service. The salary of a good engineer is never thrown away.

**WHY IS IT ANYHOW?**

Why is it that those people living where the main highways have to be built are so inclined to act hog-gish? They are always given the best roads constructed

by the counties, yet they do more kicking and ask more damage than anybody else. Their land is enhanced in value more than that of the people in outlying districts, who usually welcome a good road even though it cost not half that spent on a main highway. Road engineers tell us, though, that such is the condition that exists. The main highways really put the people who live upon them in the suburbs of the city, yet these same folks cannot be satisfied in many instances. They take it for granted that the road must come their way, so they feel they are privileged to gouge all they can out of the people's money and give all the trouble they can to the people's servants, the road authorities. There ought to be some way of effectually putting a ring in the noses of such people.

**Forrest Highway Popular.**

The Forrest Highway owes its existence to a patriotic desire of its promoters to foster and encourage a high class public highway through the heart of Alabama, connecting the great Dixie Highway with the Jackson Highway, Old Spanish Trail and other trans-continental roads of the south. Few people realize the magnitude of the work that has already been done by a public spirited citizenship on the great Forrest Highway project. Taken up as a Rome to Birmingham road, the project has been practically carried out, but under the simulating influence of this success and the original enthusiasm feeding upon its own accomplishments, has overstepped the original minor plans, and realizing the great natural demand for an outlet to the Alabama gulf coast has already perfected the permanent organization and machinery for the extension of this highway from Birmingham to Mobile.

The Forrest Highway under the guiding spirit of Mr. Richard W. Massey of Birmingham, has reached far beyond its borders to carry a far-flung idea to a great and then still greater success. The enthusiasm among the people of south Alabama, is unprecedented. No project of recent years has aroused such a high degree of enthusiasm and determination as that manifest in this proposition in South Alabama, which insures its practical completion from Rome to the gulf.

**Maintenance Cost Big Factor.**

Construction and maintenance—these are the twin elements in any practical good roads undertaking; it is worse than folly to build if the building is not to be maintained. How this can be done in the most effective and practical way, how there can be continuous maintenance of the public roads, is one of the problems now receiving the careful study of the office of public roads, the experimental road work done under its direction at Washington and elsewhere affording the opportunity of judging "the comparative economy of several types of road with reference to the traffic handled." For the last six years the office of good roads has been conducting investigations to determine the economic results of road improvement on the prosperity and development of the country. It has also been studying the methods of management, construction and maintenance of roads under local control; but it has found everywhere and in all conditions that there must be a system of maintenance for all roads if the work that is done in building is to have anything

like permanent value. There is a very definite and distinct difference between maintenance and repair; filling up a few holes in an improved highway is repairing; keeping the whole road in what may be called in the language of the day "a state of preparedness" by constant vigilance and intelligent service is maintenance. "The best system of maintenance for all roads is that which provides for the permanent and sometimes continuous employment of skilled laborers who have charge of particular sections of road, or who may be assigned to any part of the county or other road unit where there is work most needed." The continuous maintenance system has been adopted in this country only to a limited extent; but wherever it has been adopted it has demonstrated its high economic value. It might not be possible to maintain such a system in all parts of the country because of sparse population and limited resources; but, as the Year Book of the American Highway Association says on this subject, "it would be difficult to find a county which is so poor that it could not afford to employ continuously eight or ten laborers and three or four teams to maintain and repair its principal roads." That would be far cheaper than the labor tax system and it would be vastly more practical than the hit or miss policy which has distinguished the work in the past.

#### Great Road in Rockies.

Approximately \$5,000,000 has been spent in the construction of a shortline connection, termed the Salt Lake-Yellowstone Highway, between the Lincoln Highway, Midland Trail and Pike's Peak route to the Pacific Coast, at Salt Lake City and Ogden, Utah, the Yellowstone National Park, and all points in Northwestern United States, which is now open to auto traffic to within a few miles of the national park. The remainder of the route will be opened to travel coincident with the granting of permission to the entrance of cars in Yellowstone.

The highway is built on a water grade, and passes between the Wasatch Range and the Great Salt Lake in Utah, northerly through the Cache, Malad and Bear Lake Valleys in Idaho, to Pocatello, Idaho. The Idaho-Pacific or Oregon trail branches at this point northwesterly through the watershed of the Snake and Columbia Rivers to Spokane, Seattle and coast points. From Pocatello north to Yellowstone Park the highway traverses the Upper Snake River Valley on the same water grade over the Captain Bonneville trail to a point near the western border of the park, and then skirts the park to the western entrance at Yellowstone, Mont.

#### Provide Better Engineering.

Provision for an investigation and report to Congress of a preliminary plan for a system of national highways by the Corps of Engineers of the army is made in a joint bill now pending before the Senate and House committees on military affairs. The bill was introduced in the Senate by Senator John A. Shields of Tennessee and in the House by Representative John H. Small of North Carolina.

In particular this bill embodies the principle of having conducted a scientific investigation and survey of the highway routes upon which federal funds are to be expended before the work of construction is begun. It seeks, it is said, to prevent the hit or miss building of roads by the federal government which are

located not by expert surveys, but by local political influence—roads which begin anywhere in the state and end nowhere in particular. The danger of having federal funds for good roads expended in such fashion has already caused the cry of "pork" to be raised in Congress when the roads appropriation bills were under discussion.

Under the terms of the Shields-Small bill, the federal government would devote its funds and energies solely to the construction of main or trunk line highway units connecting and correlating the highway systems within the States. Instead of providing funds to pay a part of the State's bills on State roads, the federal government would take over, to build and maintain entirely, certain of the principal highways. That would relieve the States of a considerable part of their present burden and would allow them to devote more money to the building of more miles of good roads radiating from the State's highways, while townships or individuals would build good roads feeding the county highways. Thus the entire country would be woven together by a net-work of highways each system feeding the other, as is done by the railways.

#### Roads and Rural Delivery.

The beneficial effects of the rural delivery service upon the happiness and home comforts of our rural population have become established facts, and nothing contributes so much to its efficiency and regularity as good roads. The Fourth Assistant Postmaster General, in his report for the year ending June 30, 1909, writes:

"Essential facts in the value of rural delivery and as a postal facility are speed and regularity, and the attainment of a satisfactory standard in these particulars is absolutely dependent on improved roads."

The cost per mile traveled by the carrier could be greatly reduced and the length of many routes could be increased, if the roads were generally improved. In many instances the post office department has found it necessary to discontinue rural routes because of the impassable condition of the roads.

#### Tour Into Yellowstone Park.

All preliminaries for the Yellowstone tour to start from the twin cities July 20 having been completed, the attention of the National Park Highway association is now being devoted to putting the roads in condition for the excursion.

Nearly \$100,000 has been expended in the past two months in this effort to complete the chain of boulevards stretching to the Gardiner entrance.

"There is not a trip I would rather take over again right now," said Homer C. George, of Detroit, upon his return from the western journey of the trail-blazing crew. "The great spirit of hospitality that rules North Dakota and Montana along the route will be a revelation to eastern motorists and the trip will be one that they will enjoy every minute."

Mr. J. Shepard Potts, of Richmond, Va., president of the Rural Improvement League, is working up sentiment for the building of a road 350 miles long from Old Point Comfort to White Sulphur.

Polk county, Ill., will add to its road building equipment another Twin city traction engine, two Adams graders and a White motor truck.

# Virginia Road Manual Issued

**T**HE 1916 edition of the manual of the Rural Road Improvement League of Virginia is being distributed throughout the State. The manual is full of interesting facts relative to the Rural Road Improvement League; gives a brief history of the organization, the constitution and by-laws and the policy adopted by the league. The officers of the league are:

President, J. Sheppard Potts, of Richmond; vice-presidents, J. J. Owen, Green Bay; E. E. Worrall, Hillsville; W. E. Harris, Sabot; E. A. Stumpf, Richmond; E. M. McClure, Richmond; T. S. Winston, Midlothian; vice-president and treasurer, Rosewell Page, Beaver Dam; vice-president and secretary, W. Ashby Jones, Jr., of Richmond.

The vice-presidents have charge of certain districts in the road-improvement work.

The objects of the Rural Road Improvement League are:

To stimulate sentiment in favor of road improvement and to assist in the actual work where public funds are inadequate or unavailable.

To cooperate with constituted authorities and with every meritorious enterprise for road improvement and maintenance, and to eliminate the waste in road building as much as possible.

To establish intercounty committees to insure improvement of through, intercounty roads radiating from principal market centers and important railroad stations and steamboat landings.

To call the attention of cities and towns to the importance of this work and the need for their co-operation in accomplishing these objects.

To have more road improvement at the least expense possible.

## Much Good Accomplished.

A recent bulletin issued by the organization gives the following regarding the activities in road work in numerous localities:

It is especially appropriate at this time to mention the counties of Hanover, Louisa, Albemarle, New Kent, Elizabeth City, James City, Warwick and York, on account of their recent activities in road improvement through the co-operation of citizens and road authorities. In some parts of Louisa county, on this through highway, the citizens are taking charge of the portions of the road most convenient for them to manage, and are assisting their supervisors to make their limited public funds cover the necessary mileage on their principal roads. In the summer of 1915 these citizens practically rebuilt the Hollis Store to Cuckoo Road at an incredibly small expense. Four prizes were awarded them by this organization for their efficiency.

In Hanover county the supervisors are doing what they can to please citizens of their respective districts, and are accomplishing some good results. In Albemarle county the citizens have organized for the purpose of securing a greater mileage of improved roads at the least possible expense, in order to make their present road income cover as many miles of road as possible, and they are reported to be making very good progress. The Peninsula counties are working more as one unit and are to some extent co-operating with one another in their work. As these counties are somewhat dependent upon a sort of general cooperation for

complete success in this work, it may be well to deal with them more in detail.

The roads in New Kent county have long been the subject of comment, and usually favorably. But now they have elected very progressive men to their board of supervisors, and through a special act recently enacted by the General Assembly, these supervisors are given the authority necessary to conduct their work properly and at minimum expense, which relieves some of the handicaps heretofore encountered. The citizens are working, too, for immediate improvement of their highways, and work is being started now to make this portion of the Sea-to-the-Mountains Highway as good as any road in Virginia.

## Little Bethel Citizens Active.

Elizabeth City county needs more roads than its income for roads will allow, and the citizens in the neighborhood of Little Bethel, on the Sawyer Swamp Road, have organized with us to co-operate with their supervisors for the speedy accomplishment of this object. In the busy season this road, in good condition, is worth approximately \$10 a day apiece to many of the people in this vicinity to haul their vegetables to market quickly to get the best prices and to prevent loss of crops in the field—four trips a day with big loads are worth something as compared with two trips and small loads. This county has very little road machinery of its own, but is installing some and securing some more from neighboring counties and private concerns. The people are very progressive and are certain that much will be accomplished immediately.

James City county is one of the most important links in this highway system, and it would be of the greatest benefit to the people of this county to start their road work now while the boom is on in and around Williamsburg to attract as much attention as possible to their country while conditions are favorable. That portion of the road in the extreme northwest part of the country for about three miles is in rather bad condition; but it is capable of easy and inexpensive improvement, which would add considerably to the social and business welfare of that part of the county and would reflect great credit upon the county authorities, who can certainly count on active co-operation in its speedy accomplishment.

## York Roads in Fair Shape.

We are not familiar with the work in Warwick and York counties, but it is generally recognized that the principal roads are in very fair condition and responsive to inexpensive methods of improvement and maintenance. This should encourage the people there to greater efforts for more roads of this type and more comfort and more prosperity as the very logical result. These counties possess so many places of importance that they should call attention to themselves by giving access through good highway facilities.

We have covered the principal thoroughfare from Charlottesville, including Staunton, as well, through to Chesapeake Bay and the cities of Norfolk, Portsmouth, Newport News, Hampton and the great fortress of Monroe, with its many attractions, and the magnificent Chamberlin Hotel, where health and pleasure combine for our enjoyment. This road is rich in tributaries, and affords an outlet to practically every part of the state—and an inlet to most of its points of attraction—

and its immediate improvement to admit of through travel at all seasons is of great importance to all Virginia. Now is the time to begin this work in every county for the best results; and if county means are insufficient, let the citizens add some work, which will prove an excellent investment. When you have accomplished this much for yourself and your community you have aided the progress and prosperity of the people of your county and of the entire commonwealth.

#### Concrete Roads in N. C. County.

Contracts for road construction work aggregating expenditures of more than \$22,000 were awarded by the board of county commissioners of Buncombe county, N. C., recently.

Three miles of construction on a link of the Ridgecrest road running from Black Mountain to Swannanoa was awarded to P. S. Minus. This road will be sixteen feet wide. Trinkley Brothers' Construction Company was awarded a contract for a three-mile stretch of road from the corporate limits of West Asheville to Hominy. The largest contract was given to the firm of Reid and Wells, who will build a piece of road, four to four and one-half miles long, running past Emma to the county home. The last two named roads will be fourteen feet wide.

The work will be started on at once and the price to be paid by the county is \$1.25 a yard. As more than ten miles of concrete roadway will be added to the county system a large step was taken in the new road building program.

## Again the Convict Question

### How Working Lawbreakers on Public Road Building Will Solve Perplexing Problems

**W**HAT shall we do with our convicts?" This is the question that has caused grave concern to slum-workers, economists, reformers and statesmen of various knowledge and fitness all over the country. In 1910 there were 2,823 penal institutions in the United States with a population of 479,256, or 521 per one hundred thousand of the general population. The offences for which these people were sent to prison covered every class of misdemeanor and crime from vagrancy to murder in the first degree. In the same year the number of prisoners discharged, dying or transferred was 476,468, so that it would seem that the prison population runs about the same from year to year.

"What shall we do with our convicts?" That is the question. It would never do to kill all of them. In the decade 1901-1910 there were 18,609 homicides in the United States, the United States ranking third among all the countries of the world in the homicide rate, being distanced in this order only by Hungary and Uruguay. In some of the states, capital punishment has been abolished but in all the states homicide is a punishable offence, and in some of the states, or, rather, in some communities in some of the states murderers are regarded with very tender concern by emotional reformers. In all the states and generally throughout the world there has been a steadily growing demand for more humane dealing with criminals than under the Old Dispensation when the rule was life for life, eye for eye, tooth for tooth, hand for hand, foot for foot. It is better so—at least for the criminals.

"What shall we do with our convicts?" They must be fed and clothed and housed and securely guarded. The safety of the state forbids that they be turned loose upon society which they have menaced by their lawless conduct. The cost of maintaining them in idleness would be a most serious tax upon the resources of the people who are not in prison. Some healthful occupation must be found for them. It would be cruelty of the most brutal kind to keep them in confinement without exercise. It is objected that they be employed as laborers in prison in the manufacture of goods that would be put on the market in competition with similar goods manufactured by honest labor on the outside. Laws have been passed forbidding the transportation of convict-made goods—the voters in prison be-

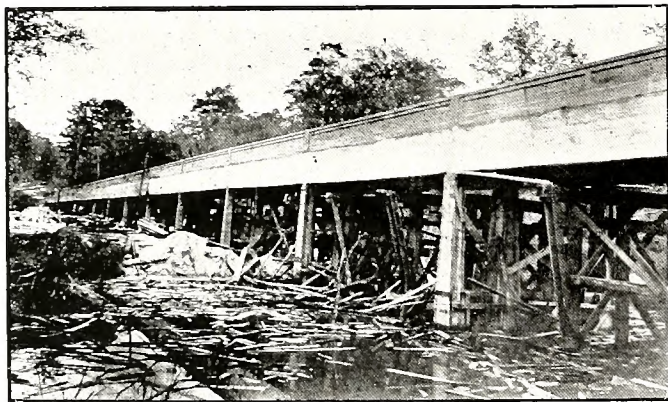
ing of no consequence when compared with the voters who are not in prison—and the demand has been increasing that the work of the prisoners shall not be stacked up against the work of free and independent labor. This comes about, largely, of course, from the great talk about humanity with which the reformers have filled the air; but "What shall we do with our convicts?"

Why not set them to work building the roads of the country? In this work they would not come into competition with free and independent labor to any great extent, judging by the general condition of the public roads of the country, and experience in quite a number of states has proved that under wise direction and supervision they can do most acceptable and thorough work in this field. In at least twenty-two states convicts are employed on road work, in an experimental way in some of states and in pursuit of a general policy in others, and wherever the work has been well organized the experiments have established the wisdom of the enterprise. In most of the states the convicts are worked under guard; but in some of the states what is called the honor system, under which guards, stripes, chains, bolts and bars have been dispensed with, is being tried out.

The Office of Public Roads and Rural Engineering of the United States Department of Agriculture has been engaged in an exhaustive study of convict labor for road work throughout the United States and will shortly publish a special bulletin reciting its observations made with the most painstaking care of work that has actually been done and recommendations as to the lines along which the best results in this field can be obtained. A most interesting experiment has been in progress since last January with the honor system "way down in Georgy" under the immediate direction of J. E. Pennybacker, chief of road economics in the Office of Public Roads, with some surprising results. This honor camp was built about the first of the present year. It has now been under the severest test for about five months. It is situated not a great distance from Atlanta. The "plant"—quarters for the convicts, offices for supervisor and clerk, and other necessary buildings—involved an initial expenditure of about \$2,000. The supervisor is an employee of the

state of Georgia and the clerk also. Forty or fifty convicts are engaged at the camp. They were selected from various other convict camps in the state and are serving sentences varying from six months to a year; their average sentence being from six to eight months. Several of the convicts sent to this camp have been returned to their former places for fighting among themselves or for other breaches of good conduct; but from the day the camp was established to the present there has not been a single attempt to escape from their service and their work has been of the most excellent order. They have removed about 25,000 tons of earth and about 20,000 tons of stone, built a very substantial bridge of concrete and completed an earth road of superior quality two miles in length. With the few exceptions noted, they have been orderly and industrious, and, without bonds or restrictions, they have done the work required of them without complaining. The most, if not all, of the convicts at this camp hail from Atlanta where they were subjected in their free life to the supposedly corrupting influences of the city and these have been invariably responsive to discipline which has not been administered with lash or gun. There have been no guns or chains or locks or bars or stripes at the camp and the passer-by would not be able to distinguish the workers here from any body of free road hands employed in doing good work.

A number of important economic lessons have been learned from this experiment. The quarters of the convicts were designed with fine regard to the health



State Aid Bridge—Pike County, Ala.

of the inmates and the very remarkable result is that among the convicts there has been less than one fourth of one per cent of sickness since the camp was established. The cost of feeding the convicts has been seventeen cents the day for three meals. The food has been the best selected for its nutritious quality upon the ration recommended by the United States Office of Public Health. The cost of maintaining the camp, counting ten per cent for annual depreciation in the value of the plant, the salaries of supervisor and clerk, cost transportation of supplies and all other incidental expenses and the cost of feeding and caring for the convicts—is only a small fraction over forty-four cents the day. This cost is lower than at any other convict camp, in the South, with the possible exception of one regular camp of the older sort in Virginia, and probably in the United States.

The people who have been charged with this experiment have been much heartened by the results that

have been obtained. They do not think that all convicts could be treated with the same consideration as the convicts at this camp; but they do think that there is room for selection among those who have been condemned to prison life and that for such as these there is a great field for service in the building of good roads where they would not come into competition with free labor and where they could work out their punishment in useful occupation under humane conditions.

### Georgia Commission Bill.

The highway commission bill prepared by the highway commission committee of the Georgia Chamber of Commerce was adopted with certain minor changes by the highway committees of the Georgia chamber, of the Association of County Commissioners of Georgia and of the Atlanta Chamber of Commerce, which held a joint meeting in the Georgia chamber's headquarters and spent practically an entire day going over the bill.

The bill agreed on by the three committees will be introduced in the legislature at the next session as a substitute for all pending bills on the subject, and will have the concerted support of the Georgia chamber, the county commissioners of the state and the Atlanta chamber.

The salient features of the bill are as follows:

It creates a state highway commission consisting of three members, two to be named by the governor and the third to be the dean of civil engineering at the University of Georgia, the two members appointed by the governor being men who hold no other office in the state government.

It provides for a state highway engineer to work under the supervision of the commission, and serve as secretary of the commission.

It provides that 15 per cent of the felony convicts of the state shall be assigned to work under the commission, and that the commission shall employ these gangs in the construction of a system of state highways connecting the principal cities and county seats of the state.

It provides that funds derived from the automobile license tax shall be paid to the commission and expended by the commission, and provides that the commission shall receive and expend all funds apportioned to the state from national highway appropriations.

### Dunne Expounds Road Gospel.

Twenty thousand people, perhaps more, heard Governor Dunne in the thirty addresses he made between Peoria and Joliet on Good Roads day, May 19, when he made personal appeal to residents of the Illinois valley along the Ivy trail that will connect Peoria and Chicago. "Pull Illinois out of the mud" was the burden of his words, cheered to the echo everywhere. Peoria does not realize that this city and county is lagging behind the rest of the state, but it is dangerously near to doing so.

The Ivy trail was followed. It needs fixing the worst kind. Its scenic beauties are indescribable but the road for a third of the way is execrable. New panoramas of river and valley unfold at every turn and it is easily understood how hundreds of touring parties will traverse the road once it is marked and made good.

Governor Dunne expounded the gospel of good roads, their real economy to the farmer and advantage to the community. The valley is wakened and the Ivy trail bound to come.

# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### Alabama Good Roads Days.

The executive officers of the Alabama Good Roads association have commenced to agitate the observance of August 14 and 15 as Good Roads day, which was legalized by the last legislature of Alabama, the observance of which is enjoined upon public officials, educational and other institutions and patriotic people of the state.

The legislature made it the duty of the governor to issue a proclamation sixty days prior to the dates, calling upon the people to observe these days. It is also made the duty of the probate judges, mayors and commissioners of the several counties, cities and towns to issue like proclamations calling upon their respective counties, cities and towns to observe Good Roads day. They also made it the duty of the state highway department to issue a Good Roads Day program or booklet and send out broadcast.

Letters have been sent to the governor, state highway department, probate judges, mayors and president of commissions by the officers of the Alabama Good Roads association, calling their attention to this law and urging said proclamations to be issued and interest aroused in this movement.

\* \* \*

### California.

Five important links, three constructed under county bonding issues and two to be constructed by the state highway commission, connecting important units of the highway system in Southern California, are to be added to the general highway system.

The improved highways include the San Fernando link of 6.4 miles and the Whittier unit of 14.1 miles, both in Los Angeles county, also the Goleta boulevard unit in Santa Barbara county extending north out of Santa Barbara 7.7 miles.

The two new units to be constructed are 5.8 miles in Mono county between Deadman creek and the Devil's Punch Bowl, and 5.6 miles in Ventura county between Springville and Santa Clara creek. These are probably the last two units that will be constructed by the highway commission under the \$18,000,000 bond issue.

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### Maryland.

The following report of roads being oiled in Maryland was recently compiled for the Automobile Club by the State Roads Commission:

The road from Elkton to the Delaware line has been oiled and the outfit is at present oiling between Elkton and Chesapeake City. Upon the completion of this work, which will be in a day or two, they will move south to Kennedyville and continue down the Eastern Shore.

The oiling truck which has been working at Rising Sun is still at that point, and upon the completion of work at Rising Sun and Conowingo, will move south, to Northeast, and oil that section between Northeast and Perryville. They will then cross the bridge at Havre de Grace and complete that section between Havre de Grace and Belair.

The truck which has been working south of Wash-

ington, in Prince George's county, has completed this work and has moved to Gaithersburg, Montgomery county. Upon the completion of work at Gaithersburg, which will be in three or four days, they will move to Baltimore county.

The truck which has been working on the Frederick pike from Ellicott City as far west at West Friendship is now working between West Friendship and Ridgeville. This truck will continue west to Ridgeville.

Oiling operations have not yet begun in Alleghany county, but in all probability the State Roads Commission will start an oiling truck on the Baltimore pike east of Cumberland on June 5, which will work westward as per notification of last week.

\* \* \*

### West Virginia.

Reports from Moundsville indicate a rapid growth of good roads in Marshall county, already many contracts having been let and no small amount of the work already under headway.

The most of the work seems to be in Union District, where 16,100 feet on the Riley Hill road comprise a macadam stretch to be completed this spring. Other contemplated grading and macadamizing for spring 7,800 feet of McBechen Hill road, 5,200 feet Mozart Hill road, 2,640 feet Brown's Run Hill road, and 4,300 feet on Boggs Run road.

The major portion of the work to be done on highways of Ohio county will take place in the Richland and Liberty Districts, where there are a larger number of unimproved roads than in any other section of the county. Engineer George Steenrod is just now a pretty busy man, as a large number of workmen have been engaged during the last few weeks to get some of the work behind them before summer.

Mr. Steenrod is required at any number of places at one and the same time, and he annihilates distance between this job and that in a big Cadillac roadster. Every piece of work is having his personal supervision, which accounts for the rapid strides already taken in getting Ohio county turnpikes in first class condition.

### Campbell County is Busy.

Campbell county, Tenn., has been quietly building a number of good pike roads. Chief Engineer E. L. Trowbridge, of the county, has general supervision of this work.

Each road in Campbell county now under construction is designated by number, beginning with the highway from Higheliff to Duff as No. 1, which is being built through the mountainous section known as the "Narrows," and which is now causing so much comment from people who have inspected the work.

Road No. 2 from Newcomb to Elk Valley, is in the course of construction. The sum of \$20,000 has been appropriated for this work.

Road No. 3, from Jellico to Higheliff has just been completed, the sum of \$3,000 having been expended for new macadam and repairs.

Road No. 4, Jellico to Newcomb, has also just been completed, the sum of \$2,000 having been expended for

new macadam and repairs. These roads are in excellent condition, and the Jellico people are much pleased with the results obtained.

Road No. 7, from Jacksboro, the county seat, to Eagle Bluff Springs, where eleven different varieties of mineral water originate on one-half acre of ground, the sum of \$5,000 is being expended. The macadam on this highway is now about one-half placed and men are hauling rock and rolling it daily. It is expected that this road will be completed within the next two or three weeks.

Road No. 8, Caryville toward Pioneer, is being constructed for a distance of about two miles for the sum of \$12,000.

Road No. 10, from LaFollette to Sweat's Ford, with a branch to Lay's Ferry, is now under construction and has been completed a distance of about six and one-half miles to Cedar creek. The sum of \$20,000 having been appropriated for the purpose.

Road No. 11, from LaFollette to Well Springs, has the sum of \$5,000 appropriated for its repair, and contractors will go to work on this highway sometime during the month.

Road No. 12, from the end of the pike at the fork of Powell river to the Union county line, will be macadamized, the sum of \$3,000 having been appropriated for this work, commencing early in June, it is announced.

Road No. 13, from Dossett & Miller's store to Flat Hollow and the Claiborne county line, has been under construction for several months, the sum of \$10,000 having been appropriated.

Road No. 14, from the LaFollette and Forkvale road to Race Track Hollow and Hatmaker, has been completed one mile, for the sum of \$3,000. This highway is built through a chert country and is an excellent road upon which automobiles can travel at a high rate of speed, no macadam being necessary.

The special acts of the legislature of 1911, 1912 and 1915 provided that the sums of money designated for the various roads was for the purpose of completing that road as far as the money provided would pay for.

#### DuPont and Good Roads.

West Virginia, once known as the state without a modern road, is fast coming to the front in securing the types of highways. The last few years has been bond issues amounting into millions for building better roads in this state.

When Coleman du Pont first told the farmers of the country that they were spending about 23 cents for every mile they hauled a ton over poor roads and that this cost would be reduced to 8 cents a mile on good roads, they were astounded and slow to believe it. But du Pont proved it to them. He put it up to them as a business proposition. And that one statement of his has done more than anything else to give impetus to the good roads movement.

Du Pont has been everything from a day laborer in the coal mines to head of one of the greatest industrial corporations in the world. He has been a banker, a farmer, a mine operator and a builder of railroads and has been signally successful in every thing he has undertaken. It has been said that if he were president of the United States, he would save the country three hundred millions of dollars through economic business methods. And he believes that the federal government should extend every possible aid in the building of good local and national highways.

## GOOD ROADS NOTES IN BRIEF

The directors of the Forrest Highway Association have chosen the eastern route in Alabama, leading through Luverne, Andalusia, Brewton, Atmore and Bay Minette.

Washington township of Beaufort county, N. C., is building 80 miles of soil roads. The town of Washington and county officials jointly are also spending \$15,000 for a concrete road across Pamlico river.

Forrest county, Miss., reports that it will finish its part of the Jackson Military Highway within the next few months. Convicts have been placed on this road. Jones county, a neighbor to Forrest, has done very little so far it appears.

The state of Minnesota is to be one of the leaders in the United States during this year. Work is planned from state aid on 3,000 miles of road, with funds amounting to over four million dollars.

Sevier county, Arkansas, authorities have approved the petition of citizens to have that county's portion of the Jefferson Davis highway built at once. There will be 28 miles of this road.

Georgia now has 13,500 miles of surfaced roads and 38,628 miles of other roads that are adaptable to bad weather. Her total mileage is within a few miles of 100,000.

The second automobile tour to traverse the entire length of the Dixie Highway from Florida to Chicago left Leesburg, Fla., on June 28th.

Monroe county, Ala., has just awarded the contract for the building of a 60-mile road that will be tendered as a part of the Jackson highway. Other adjoining Alabama counties are also in the race and are building some fine highways.

The national hoboes' association have passed "ringing" resolutions declaring they are "agin" good roads and the vagrancy laws. There is a sneaking feeling that if were not for the vagrancy laws they would be for good roads.

Two districts of Ouachita parish, La., have voted a half million dollars in bonds, by the overwhelmingly ratio of 437 to 9. A peculiar feature of this election was that not only votes were cast but property values were voted, the result of the latter being \$1,294,000 for the tax and \$45,000 against.

California has undertaken a tremendous project in the construction of a state built road from one end of the long commonwealth to the other. Already there have been \$18,000,000 spent on this highway and the people will vote this fall on a bond issue of \$15,000,000 yet needed for its completion.

Jefferson Davis parish, La., recently voted a half million dollars in road bonds by an overwhelming majority. The bonds had already been sold, pending the result of the election, and work will not be delayed in getting under way.

Pike county, Ark., has prepared plans and sent to the highway engineer of the state for approval of its part of the Jefferson Highway, 16 miles in length. The cost will be \$60,000.

Colbert county, Ala., recently sent out a hurry call for an engineer to lay out certain portions of the Jackson Highway that its commissioners want to get built as early as possible. Colbert lagged behind many Alabama counties during 1915, but shows signs of catching up with the procession.

# Care In Building Culverts

## Importance of Caring for Drainage One of Paramount Questions in Road Construction

UNTIL recent years several of the more exclusive and respectable cities in the United States were without an underground system of sewers. They were furnished with open sewers, or tidal drains, or cess pools, all of which were much approved by the scientific authorities of the period but none of which contributed to the preservation of the public health. In the European cities about three hundred years ago, persons who claimed to be better than the rest insisted on the right to walk close to the walls of buildings in passing along streets. That was a queer thing for them to do, as seen through the spectacles of the present age, but it was a wholly natural thing in view of the fact that the centre of the streets was then lower than the sides and served as a drain or open sewer, just such as obtained in New Orleans only a few years ago, for the refuse of the adjoining houses. This central drain was called the "kennel," so that when the arrogant swash-buckler ordered the humble citizen to get himself away into his kennel he did not mean to consign him to the dog-house but to the squalor of the middle of the road. In France this central drain was called "coulonere," which meant a channel, or gutter, or gallery, and which has come to mean in later times in the English speech of the roadbuilders the culvert, "an arched or flat-covered drain of brick-work, pipes or masonry carried under a road, railroad, etc., for the passage of water." Without the word, the road-builders would not know how to describe their work and without the culvert it would not be possible to build good roads.

If it be poorly built, it will certainly become the source of danger and great expense. Here is a case in point: Some years ago on the best road from Springfield to Pittsfield, Massachusetts, there was a section several miles long which was crossed by culverts built of rough stone without cement, the slabs forming the tops of the culverts being supported by the side walls. These culverts were all small, probably not more than eighteen inches wide, and their tops were covered with only a few inches of earth and gravel. One year, the warm weather of spring was very late and the rainfall was heavy. When frost came out of the road the culverts were disturbed, their joints were opened and the earth and gravel were washed into the culverts, the mass being increased with every rain until finally the culverts were almost wholly choked, with the result that the water delivered to the culverts flooded the side ditches, leaked through the stonework into the foundation of the roadway and so softened it that the culverts were thrown out of position and made useless for the purpose of their construction. The practical effect of bad culvert construction was observed by thousands of witnesses on Decoration Day of that year. The heavy rainfall just before the celebration converted this stretch of road into an ocean of mud with occasional pools of water so that one could not tell exactly the condition of the road at any point. There was on this day heavy automobile travel from Springfield to Pittsfield. The driver of a car taken in the evening to the largest garage in Pittsfield was congratulated on delivering his machine intact because it was only the third making the trip that day that had not come in

with broken spring, sprung axle or other quite serious injury caused by a wheel dropping into a culvert through an opening in the top.

It may be said that such a record of a day's troubles caused by defective culverts is unusual, and it is, but it is exactly what may be expected to happen under the same conditions anywhere at any time. No culvert that is improperly built is safe or economical. On the contrary, it is a waste of money to spend it on such work unless the work is well done on an approved plan under competent direction. There must be calculation as to the volume of water the culverts are to carry off in rainy season and flood time, not in dry weather, and as to the durability of the material used in their construction. There can be no skimping on culverts or bridges or drainage without waste. It is better to have these three things permanent and adequate than to have an expensive form of road surfacing if a choice must be made. The man who built his house on shifting sand instead of solid rock has been regarded for centuries as the prince of fools.

If the culverts are not built of good material they will have to be rebuilt in a few years, whatever the quality of the roads they are made to serve. Defective culverts vitiate one of the elementary principles of highway economies, and the interests of the taxpayers require that the annual cost of every part of the roads built for their use be reduced to the lowest possible figure consistent with efficiency. Manifestly, it would be worse than folly to build culverts of boards to take care of roads that have cost hundreds or thousands of dollars the mile and it would be none the less foolish, or worse, to waste money in work of this sort with the use of bad material.

### Requirements to Be Observed.

In building a culvert the road-builder must observe three fundamental requirements:

1. The first requirement is that the culvert must be so placed that it will drain across the road, and under the road, of course, all the water that is delivered to it by the side ditch along the road. If this be not done the earth along the road and about the end of the culvert will be wet and soggy the most of the year and the culvert opening will require almost constant repairs. Repairing a highway culvert is relatively more expensive than similar work in a town because of the waste of time of the workmen in going to and from the point at which the work must be done. In placing the culvert care must also be taken that it will not be choked by brush and leaves, and this duty must be discharged by the road supervisor, and will be, if he is worth his salt.

2. The second and very important requirement in the building of a culvert is that its ends must be protected by some kind of wall or facing carried down to a firm foundation. If this be done, it will be found that the end of the culvert will not be undercut by the water and will not be broken, frost will not injure it, the surrounding or superincumbent earth will not slide down into the ditch in front of the opening, and, with the further necessary work of keeping the feeding

ditches clear, the culvert will be able to take care of all the water alongside the road.

3. The third requirement is that the culvert must be made so strong that it will not become broken and so tight that it will not leak. These ends can be reached by building the culvert of masonry, concrete or of good piping. The material to be used must be determined by the relative cost of the several materials at the locality where the culvert is to be built and by the distance from the top of the culvert to the surface of the road. All technical features of culvert building are explained in pamphlets printed for the use of road supervisors by the highway departments of most states and by the United States Office of Public Roads and Rural Engineering at Washington. These pamphlets can be obtained free of cost upon application so that it is possible for all road supervisors to be their own culvert builders by following instructions. After all, the road supervisor is a most important factor in this work. If he look after his culverts well, he ought to be retained in office; if he do not, the sooner he can be replaced by one who will do so the better for the public that uses the roads and particularly for the taxpayers who pay for them.

#### In Hamilton County, Tennessee.

Tennessee state highway officials have officially designated six county roads as state highways, roads upon which revenue arising from the automobile tax will be expended. The designation in Hamilton county of state highways covers seventy-five miles. All of the state highways in the county have heretofore been designated as county highways by the county court and the city commission as provided for in the Spurlock road law. Following is the list of state highways in the county, each one leading out to a county seat:

No. 1—Chattanooga to Cleveland (twelve miles in Hamilton county) to James county line. Designated by county as Chattanooga-Cleveland pike.

No. 2—Chattanooga to Dayton (twenty-nine miles in Hamilton county) to Rhea county line. Designated by county as Chattanooga-Dayton pike.

No. 3—Chattanooga to Pikeville (nineteen miles in Hamilton county) to Sequatchie county line. Designated by county as Chattanooga-Signal Mountain and Chattanooga, Sequatchie county pike. Route via Signal mountain.

No. 4—Chattanooga to Trenton, Ga., (six miles in Hamilton county) to Georgia state line. Designated by county as Chattanooga-Birmingham pike.

No. 5—Chattanooga to Jasper (six miles in Hamilton county) to Marion county line. Designated by county as Chattanooga-Nashville pike.

No. 6—Chattanooga to LaFayette, Ga. (three miles in Hamilton county) to Georgia state line. Designated by county as Chattanooga-Atlanta pike.

#### May Change Dixie Route.

Judge M. M. Allison, of Chattanooga, president of the Dixie Highway association, has written to citizens of Kingston, Cartersville and Marietta, Georgia, stating that unless the link of the Rome-Atlanta western division of the Dixie highway, from the point where it joins the eastern division from Cartersville, through Kingston to the Floyd county line, is improved and put in first-class condition, he will recommend that the Georgia directors of the Dixie Highway association re-

locate the route of the highway between Rome and Atlanta.

President Allison states that the Bartow county commissioners have shown no disposition, apparently, to improve this part of the road, and that, out of justice to the citizens of Rome and Floyd county, this bad stretch of road will not be allowed to stand in the way of the western division getting its share of the travel.

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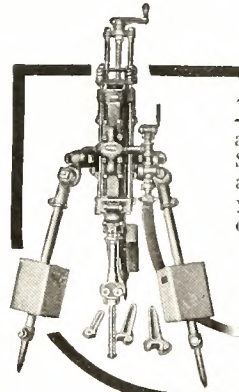
Already the citizens of Paulding county, of which Dallas is the county seat, have evinced a great deal of interest in the Dixie highway and have organized an association to build a road from Rome to Atlanta, via Dallas, and ask the directors to name it as the western division of the Dixie highway between Rome and Atlanta. Every county between Rome and Atlanta is represented in this association and active steps are being taken toward the construction of a road.

#### 2000 Pound Motor Truck Climbs Famous Mountain.

On June 14th Pike's Peak, famous mountain of the Rampart Range, which was discovered by Zebulon Montgomery Pike in 1806 and successfully climbed for the first time in 1819 by the exploring party of Major S. H. Long, all but yielded its cog railway and leg muscle allegiance to a motor truck. The truck, a Model F 2,000 pound International carrying four men, ran up the world's highest highway as far as it was completed without a mishap and without an adjustment.

The party, which consisted of Mr. H. J. McKenna, general agent for the International Harvester Company of America, Denver, Colorado; Mr. Harry Huffman, International Motor Truck dealer at Colorado Springs; Mr. Raymond B. Stamm, motor truck salesman; a photographer; and Mr. Harley McGregor, owner of the truck, started from Colorado Springs where the truck engages in daily transportation service. The party first passed through the Garden of the Gods, rambled on to Manitou, thence through Cascade Canyon, and then over the historic Ute Pass. At Cascade the party left the Ocean to Ocean highway and began the real ascent toward the summit of Pike's Peak.

As the motor truck skipped on up the side of the



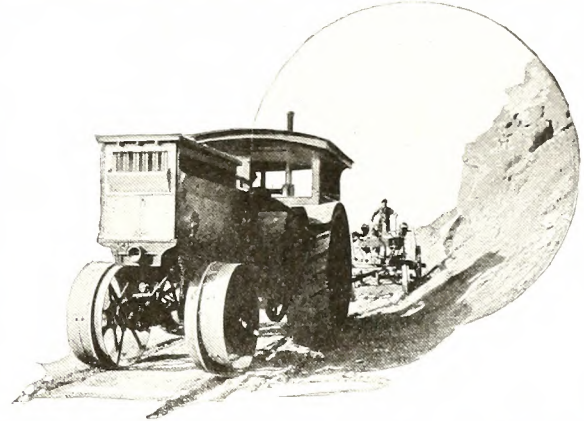
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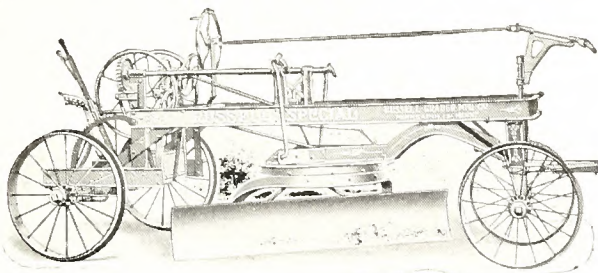
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mountain the magnificent views of the great Rocky Mountain region began unfolding themselves. Cameron Cone, Mount Sachett, Mount Bald, Mount Rosa, and Mount Cheyenne came into view. After reaching an altitude of 11,000 feet, the truck began to pass through perpetual snow banks. At an elevation of 12,000 feet where the truck was finally stopped by falling boulders from the blasting which was in progress on the unfinished part of the road above, the timber line had been left behind and the truck stood within 2,108 feet elevation of the summit.

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The meeting of the Kentucky Good Roads Association, held in Louisville last month, pledged itself to stand by the state aid law that has proven so beneficial. Robert J. McBryde, Jr., presided.

Florida will spend over two and half million dollars on the Dixie Highway alone during 1916.

The county commissioners of Fate county, Miss., have issued \$200,000 worth of bonds for the purpose of building 55 miles of gravel roads in that county.

In 1916 Boone Way will be routed to Lexington, Davidson county, N. C., Boone's old home, and within next eighteen months will be route to Warrenton, Missouri, Boone's last home. Distance between the two homes, 1,000 miles.

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**JOSEPH HYDE PRATT, Chapel Hill, N. C.**

# SOUTHERN GOOD ROADS

Published Monthly  
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Lexington, N. C., August, 1916

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## Southern Appalachian Good Roads Association

**Eighth Annual Convention Meets at Lexington, Kentucky, September 5-8,  
Inclusive—Important Matters Will Demand Its Attention**

**T**HERE are many reasons why this Eighth Annual Convention of the Southern Appalachian Good Roads Association should be the most successful and useful convention ever held by the association. As the road work in this section continues to enlarge, problems come up which can be met most successfully by a getting together of all those who are interested in road construction throughout this general section and discussing these problems. Since the last convention of the association, Tennessee has organized a State Highway Department and the State Highway Commission of North Carolina has gotten well under way. Also, since our last meeting Congress has passed an act appropriating \$75,000,000 for federal aid to states in road construction, with an additional \$10,000,000 to be used on roads in the Forest Reserves.

### Federal Aid.

This bill is very explicit in its requirements of the states and it will be of advantage to a state to have as many of its road officials as possible present so as to listen to the discussions of the provisions of this act by the officials of the United States Office of Public Roads, which will enable them to thoroughly understand how advantage can be taken of this federal co-operation.

One of the provisions of this act is that the roads constructed by means of federal aid must be maintained, or the Secretary of Agriculture shall thereafter refuse to approve any project for road construction in said state until such road has been put in a condition of proper maintenance.

The following have been asked to take part in the discussion of the Federal Aid Road Bill: Honorable David F. Houston, Secretary of Agriculture; Mr. L. W. Page, Director, United States Office of Public and Rural engineering; Mr. Henry S. Graves, Forester, or some representative of the United States Forest Service; Mr. George P. Coleman, executive committee of the American Association of State Highway Officials; and others.

### Maintenance.

As seen from the above, to take advantage of this federal aid an efficient system of maintenance must be worked out by each state, and at this convention this question will be taken up very fully by many who have

successfully carried out certain systems of maintenance. Among those who are to discuss this are: Mr. Robert James in charge of the Division of Maintenance, United States Office of Public Roads and Rural Engineering; Mr. Henry G. Shirley, president of the American Association of State Highway Officials and State Road Engineer of Maryland; Mr. W. A. McGirt, chairman of the board of county commissioners of New Hanover county, North Carolina, which has successfully adopted a patrol system of maintenance; Professor C. M. Strahan of the Highway Department of the University of Georgia; Mr. O. B. Wynn, chairman of the board of county commissioners of Fulton county, Georgia.

### State Highway Departments.

Because of the losses recently sustained by portions of the Southern Appalachians, especially sections of Virginia, West Virginia, North Carolina, Tennessee and South Carolina, by floods and heavy rains; and because a great many of our through highways in this general section have had long stretches practically demolished by these rains and swollen streams; it seems to be all the more necessary for us to get together to devise ways and means not only for rebuilding these broken links, but for extending the highways, so that this general section can not only overcome its present calamity but the result will be an even greater achievement for the future of this splendid section of our country.

If the various State Highway Departments of these Southern Appalachian States work together, there can be accomplished a great deal more in a short time in repairing the damage done by these recent floods than by each state working independently; and there will be a thorough discussion at the convention of the needs of the several states by members of the various State Highway Departments. Among those who have been invited to take part in this discussion are: Mr. W. S. Keller, state road engineer of Alabama; Mr. J. J. Murray, secretary of the State Road Department of Tennessee; Mr. A. D. Williams, State Road Engineer of West Virginia; Mr. W. S. Fallis, State Highway Engineer of North Carolina; Mr. C. B. Scott, Assistant Highway Commissioner of Virginia; Mr. Robert C. Terrell, former State Highway Engineer of Kentucky.

The Southern Appalachian Good Roads Association

now includes in its membership the states of Maryland, Kentucky, West Virginia, Tennessee, North Carolina, South Carolina, Georgia and Alabama; and because of the peculiar problems common to the Southern Appalachian portions of these states; because of their common interests in industrial life; and because of their vast natural resources which are of interest to the tourist and investor; we feel that they should come together and work out their road problems in common so as to make it possible to have stretches of good roads connecting each of these states at all desirable points of contact.

It is the opinion of many who have given serious thought to the revenue derived from the taxes on automobiles, that this fund should be used simply for the maintenance of roads, and this will in many instances solve the problem of the state's guarantee that the roads built under federal aid will be maintained. Among those who are invited to discuss this topic are: Dr. H. M. Howe, president of the American Automobile Association; Mr. James A. Gray, Jr., of the State Automobilists' Association of North Carolina; Mr. Charles Henry Davis, president of the National Highways Association.

#### **Use of State's Prisoners on Public Roads.**

There continues to be an ever-increasing interest in the question of working prisoners in the construction of public roads, and if this movement grows in the next five years as rapidly as it has in the past, a very large majority of the prisoners of this country will soon be at work constructing public roads. The idea of leasing them and considering them as collateral out of which the state shall derive an income, will soon be obsolete. This subject will be thoroughly discussed at the convention and the following have been invited to lead this discussion: Mr. E. Stagg Whiting of Columbia University and of the National Prison Board; and Dr. Joseph Hyde Pratt of Chapel Hill, North Carolina.

#### **Other Speakers.**

It is planned to have on the program short addresses from the governor of each of the states; talks from Congressmen; reports from county road officials and from representatives of special highways, such as the Memphis-Bristol-Washington Highway, the National Highway, Knoxville-Atlanta, Asheville-Greenville, Asheville-Murphy-Atlanta (including the Asheville-Murphy Scenic Highway), the Central Highway of North Carolina, Knoxville-Cumberland Gap-Cincinnati, Charlotte-Asheville (including the Hickory Nut Gap Road,) Boone Way, Bristol-Bluefield-Pittsburg, Wilderness Road through Kentucky, Lincoln Highway, etc. The presidents of the various local good roads associations will be given an opportunity to make a very brief statement in regard to the work of their associations. Questions of location, construction, administration, etc., will be taken up by experts and men who are fitted to give points which will be of interest to those attending the Convention.

#### **Railroad Rates.**

The Board of Commerce of Lexington is trying to arrange for special railroad rates to Lexington from all points along this line, and the delegates will be notified by this board in regard to this matter as well as in regard to hotels.

#### **Appointment of Delegates.**

Special delegates will be appointed by the governors of the various states, county commissioners, road commissioners, mayors of cities, chambers of commerce,

boards of trade, and various other organizations. An invitation, however, is extended to all the citizens of this general section who are interested in the promotion of good roads and in the public weal, to attend this convention.

#### **Exhibits.**

An invitation is also extended to county and township road officials to make exhibits of their road work by photographs, maps, road materials, etc.

Representatives of companies manufacturing road machinery, surfacing materials, culverts, bridges, and other road supplies are cordially invited to attend the convention and to make exhibits of their materials. They can also have on display advertising matter, and arrangements can be made for its distribution.

#### **Kentucky's New Commissioner.**

Rodman Wiley, appointed State Road Commissioner by Gov. Stanley to succeed R. C. Terrell July 1, is a graduate of State University, having been honor man of the class of '06. He has had a varied experience in engineering in the department of roads for two years and a half.

He spent two years in California as an engineer on a hydro-electric project of the Great Western railroad and chief engineer and superintendent of construction for the Livermore Water & Power Company.

He was afterward in charge of the overflow basin survey of the \$25,000,000 project of the Mississippi River Power Company at Keokuk, Ia., and as tunnel superintendent for a \$10,000,000 project in Mexico. He is a native of Scott county.

#### **Celebrate Concrete Road Opening.**

Guilford county, North Carolina, is planning one of the biggest road celebrations ever held in that state on the occasion of the opening to the public of the fine concrete road between Greensboro and High Point, two of the leading cities of the Piedmont section. This road is fifteen miles long and has been constructed at a cost of probably more than \$12,500 per mile, both cities joining hands with the county commissioners to secure the splendid highway, which is now North Carolina's finest road. The road is expected to be entirely finished within two or three weeks from now and the celebration has been planned for early in September. A committee has been named to arrange a program for the occasion and they have been authorized to use funds a plenty to secure a program that will do justice to the occasion. A big barbecue and speakings by road leaders, automobile parade, probably aeroplane flights and other features will be provided. The place of the celebration will probably be Jamestown, which is about middle way between the two cities.

#### **Road Celebration Planned.**

More than \$25,000,000 has been appropriated for improvement of the Dixie Highway, and to celebrate this fact the Cincinnati Dixie Highway Council will hold one of the greatest good roads expositions and conventions in American history during the ten days from September 1-10, inclusive. Music Hall, where the International Association of Rotary Clubs will hold its 1916 convention July 16-20, will be completely filled by exhibits of automobiles, good roads machinery, implements and materials, and samples of improved roadways. Plans are being made to care for more than 100,000 visitors during the week.

# Boone Way--History and Construction

By HENRY ROBERTS

Vice President at Large, Southern Appalachian Good Roads Association

**W**HEN Abe Lincoln's father, Thomas Lincoln, and his mother, Nancy Hanks, left their homes on the waters of the Watauga and followed Daniel Boone's trail to Kentucky, they little dreamed of what was coming.

When Daniel Boone blazed the trail from Fort Watauga through Cumberland Gap to Boonesboro, he knew that civilization would rapidly follow, but he probably did not dream that nearly a century and a half later a great highway would be constructed along his trail and named as a memorial to him.

The restless spirit of Boone caused him to roam the forest wilds further than his fellows, and after locating the trails across the Blue Ridge at Blowing Rock and at other points above the head waters of the Yadkin, he built a cabin at Boone, on the head waters of the Watauga, from which point he hunted for several years

with the instinct of the real locating engineer, he located the trail through the wilderness so well that his original location has been practically followed by the engineers of modern times.

True, the trail intersected the Great Indian Warriors Path at Moccasin Gap and followed it into Kentucky, but history tells us that the Warriors Paths were not easily found or followed.

Four years later, in 1779, the Virginia legislature passed an act, reciting that great numbers of people were settling in the county of Kentucky, and that great advantages would redound from the free and easy communication with them, and appointed commissioners to explore the country, trace out the most convenient site for a road, and cause it to be cleared and opened for travelers and pack-horses, and report the practicability of making a wagon road. The act provided for a guard of fifty men to protect the commissioners and laborers. The road was accordingly opened in 1780-81 from Fort Chiswell through Cumberland Gap into Kentucky. It intersected the Boone Trail on Reedy Creek, now in Sullivan county, Tennessee—it being then thought that Reedy Creek was in Virginia—and followed the Boone Trail from that point into Kentucky.

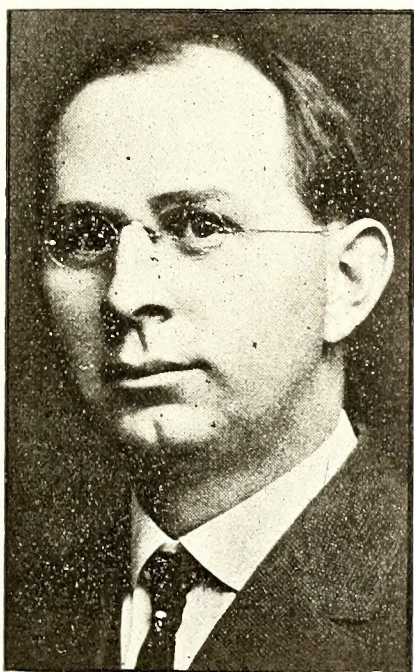
During the next fifty years after Boone blazed the trail to Kentucky, tens of thousands of pioneers from the Carolinas, and Virginia, and even from Maryland and Pennsylvania, followed him through Cumberland Gap to Kentucky and beyond. The state of Kentucky was organized in 1792.

No improvements seem to have been made on the road until 1792, when a considerable private subscription was raised to improve the road, which subscription was headed by Isaac Shelby, who had followed Boone from what is now Bristol to become the first governor of Kentucky.

In 1795, the Kentucky legislature passed an act entitled "An Act Opening a Wagon Road to Cumberland Gap." The act recites that, "Whereas it is essential to the true interests of this Commonwealth that a good road should be made to Virginia, and whereas the General Assembly is desirous that no impediment may stand in the most speedy and beneficial execution of the work, and is willing that the largest sum that the present state of the public funds will admit of should be consigned for that purpose," an appropriation of two thousand pounds was made. The road was to commence at Crab Orchard and thence through the Hazel Patch to Cumberland Gap, and to be perfectly commodious for carriages and wagons carrying as much as one ton weight.

In 1797 the legislature appropriated five hundred pounds for the repair of the road and the erection of a toll-gate, or "turn-pike," as it was called in the act. Appropriations were thereafter made from time to time for the repair of the "Wilderness Turnpike," but it was only a mountain road, worked and repaired, and provided with bridges and ferries.

In later years, the states of Virginia and Kentucky unfortunately abandoned their interest in this and other roads, and turned the same over to the counties to



HENRY ROBERTS, Bristol, Va.

Vice President at Large Southern Appalachian Good Roads Association

throughout the Cherokee country covered by Southwestern Virginia, East Tennessee and Kentucky, and was in command of the Virginia forces on the Clinch River during Lord Dunmore's War, and had so familiarized himself with the territory that he was the logical man for Col. Richard Henderson to select to locate a trail to Kentucky.

As soon as the treaty was signed with the Cherokees at Fort Watauga on March 17, 1775, whereby Henderson and associates acquired the questionable title of the Cherokees to Transylvania, Boone, who had been engaged for the purpose, started at the head of a number of men to blaze the trail to the "dark and bloody ground." With the information already acquired and

be maintained by them. From that time through many decades, the old Wilderness Road did not receive the attention it deserved from the counties, and especially after the railways were built it became a monument to the neglect of the county officials, until the states again became actively interested a few years ago.

#### Modern Movement to Rebuild.

The modern movement to rebuild this great highway was started with the organization of the Southern Appalachian Good Roads Association seven years ago. That organization, and the North Carolina Good Roads Association, have been promoting and pushing the construction work in North Carolina for several years. In January 1913, the Bristol Board of Trade organized the Bristol-Lexington Highway Association, and the Mt. Vernon Chamber of Commerce organized the Boone Way Boosters Band, "Workers for a National Highway from Cumberland Gap to Crab Orchard," and a little later the Boone Trail Highway Association was organized at Winston-Salem. During 1915 the Boone Way Association was formed at Mt. Vernon, Ky. These organizations and the work of the Daughters of the American Revolution in marking the Boone Trail through North Carolina, Tennessee, Virginia and Kentucky have all contributed to the progress of the movement. The Kentucky Good Roads Association, the Southeastern Kentucky Good Roads Association, and the Louisville Automobile Club should also be mentioned in this connection. For the past three years the Southern Appalachian Good Roads Association has been actively engaged in promoting the construction work

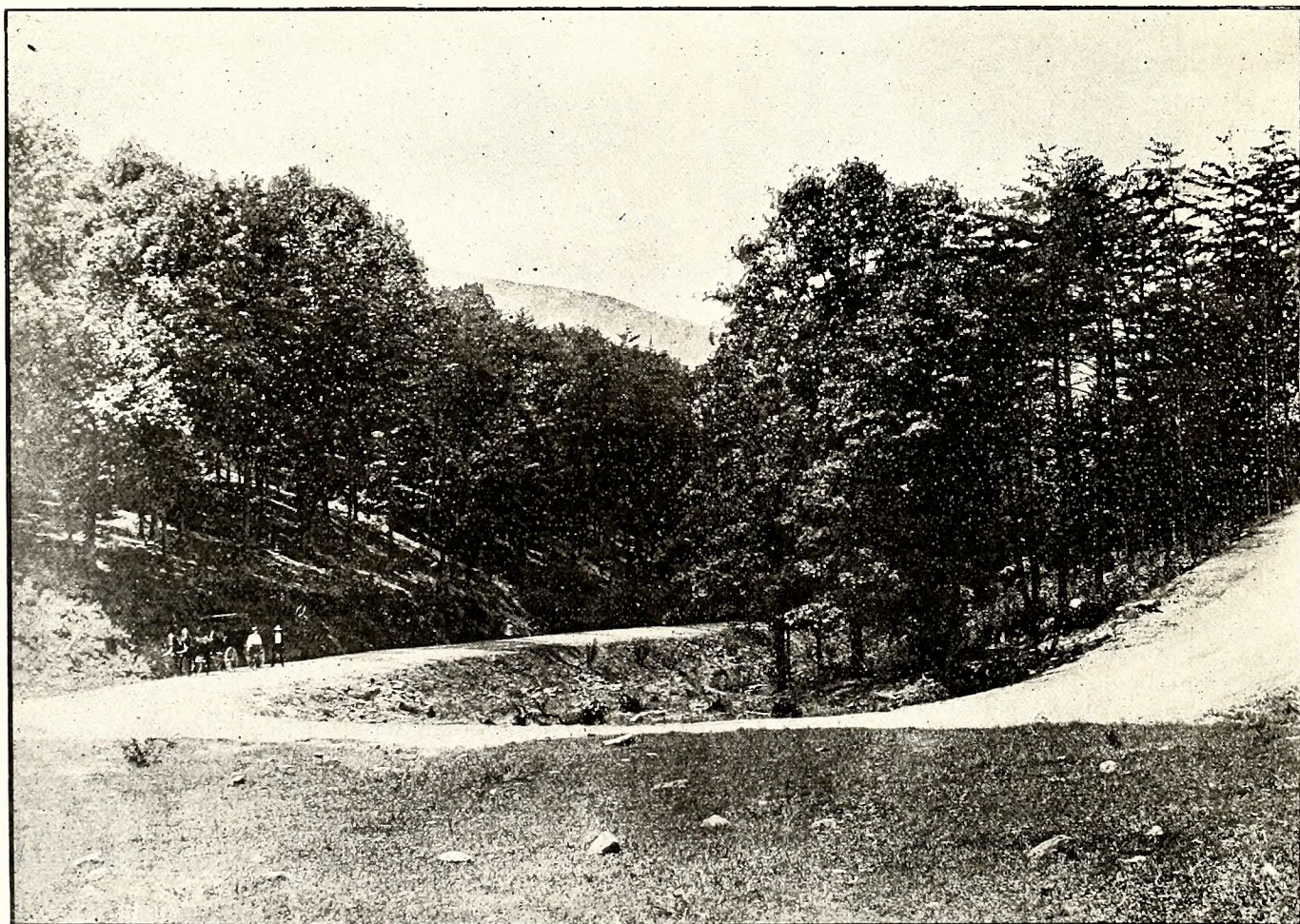
through the four states just mentioned. The State Highway Departments of Kentucky and Virginia have actively encouraged the work, also the highway departments of North Carolina and Tennessee, since their organization. The Virginia State Highway Commission has constructed 21 miles of macadam road from Cumberland Gap eastward to Boone's Path with Convict Road Force, and now has the same force engaged in macadamizing the section from Pennington Gap to the top of Powell Mountain, the construction funds being supplied by Lee county.

#### Construction Progress and Inspection Tour.

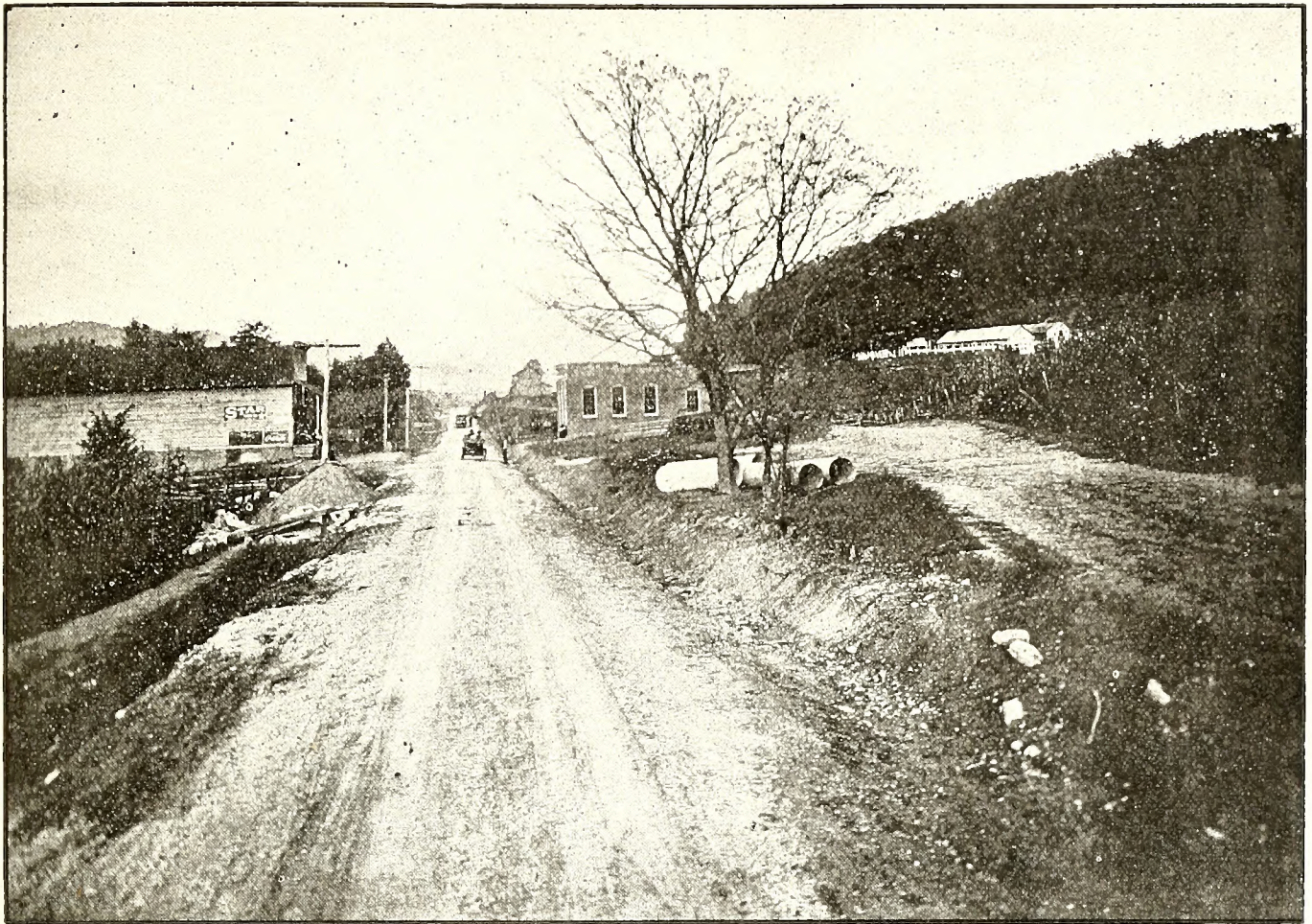
Beginning at points on the National Highway in North Carolina, the southern branch of Boone Way is now open for motor travel from Charlotte and Lexington to Newton, and thence to Hickory, Lenoir, Blowing Rock, Newland, and Elk Park to the Tennessee line. The greater part of this is sand-clay construction, which gives a hard surfaced road the year round, while some short sections are well graded and drained.

The northern branch of Boone Way in North Carolina is now open for motor travel from Winston-Salem via Yadkinville, Elkin, North Wilkesboro to Jefferson. This road is hard surfaced from Winston-Salem to Elkin, and graded from Elkin to Jefferson. This branch of the road is not open from Jefferson to Mountain City and Bristol.

By the spring of 1917 the Carter county, Tennessee, link of the section from Linville to Elizabethton will be open for motor travel. This entire section will be then graded and a part of it macadamized, and the



Demonstration Macadam Road built through Cumberland Gap by U. S. Road Engineers. Scene at Virginia-Tennessee Line



"The Open Road to the West"—The Boone Highway Near Cumberland Gap

greater part of the 18 miles from North Carolina line to Elizabethton, Tennessee, will be macadamized during 1917. The 22 miles from Elizabethton to Bristol is macadamized.

From Bristol to Cumberland Gap, 100 miles, the road is now passable, 35 miles being macadamized (in Lee County), 40 miles graded, and 25 miles of old earth road in fair condition in dry weather. Construction work is progressing at several points, and provision has been made for grading practically the entire road and for macadamizing about 60 miles of same. During the summer and fall of 1917 motor tourists will have no trouble in getting over this section of Boone Way except in very wet weather. The route is Bristol, Gate City, Speers Ferry, Clinchport, Duffield, Powell Mountain, Stickleyville, Pennington Gap, Jonesville, Cumberland Gap.

Special mention should be made of the work of R. C. Duff, J. C. Parrish and others of Duffield and that section of Scott and Lee counties, in raising about \$8,000 with which to grade BOONE WAY across Powell Mountain from Duffield to the old site of Scott's station at the head of Wallens Creek. The two boards of supervisors contributed nearly half of this fund. The grading has been done this year with a steam shovel. The distance is seven miles.

A United States government demonstration road was built from Cumberland Gap, Tenn., through Cumberland Gap to Middlesborough, Kentucky, about five years ago, and this road of nearly three miles length, has had a potent educational influence in that section. The funds were contributed by progressive citizens and corporations of that vicinity and by the three counties of Clairborne, Lee and Bell as well as the two towns.

The pike system of central Kentucky extends from

Louisville and Lexington to Crab Orchard, and the 100 miles of road from Cumberland Gap to Crab Orchard has been a greater barrier to progress in recent times than it was in Boone's day, but when the Kentucky legislature, in 1914, enacted State Aid Legislation, the day of this barrier was doomed, and Bell, Knox, Laurel and Rockcastle counties quickly voted bonds with which to build Boone Way from Cumberland Gap to Crab Orchard. Bell county has graded the entire length of the road through the county and macadamized a part of same and will macadamize the greater part of the road this year. The other counties are now grading their sections, which grading is about half completed and it is expected that the entire 100 miles will be graded by the spring and macadamized by the fall of 1917. This section of the road is now passable for motor travel, although it is rough crossing Wild Cat Mountain. Automobilists in that section have recently established a ferry across Rockcastle River. The route is Cumberland Gap, Middlesborough, Pineville, Barbourville, Corbin, London, Mt. Vernon, and from thence to Crab Orchard or Berea.

While Boone Way is now passable for motor travel and may be traveled without much inconvenience in dry weather the entire distance from Charlotte and Lexington, N. C., to Louisville, Ky., except between Linville and Elizabethton, it is not recommended for motor travel until May, 1917, when the entire road will be open.

When it was decided last October to hold the Eighth Annual Convention of the Southern Appalachian Good Roads Association at Lexington, Ky., it was assumed that Boone Way would be open for motor travel from North Carolina to Kentucky, and it was planned for President Joseph Hyde Pratt and others, to make an

inspection tour over the highway and report to the convention, which meets in Lexington September 5-8, 1916, but the scarcity of labor has prevented the opening of the Linville-Elizabethton link, so that the inspection Tour will be made from Bristol to Lexington under the direction of the writer and A. Gray Gubner, of Bristol, who will be joined by a number of automobilists from Bristol and other points, en route.

In years to come hundreds of thousands of the de-

scendants of the hardy pioneers who followed Boone Trail through Cumberland Gap to Kentucky and the states to the north and west, will motor back over Boone Way to visit the scenes made historic by their ancestors and the stalwart settlers they left behind. At Bristol, they will see the grave of General Evan Shelby, one of the heroes of Kings Mountain, and the father of Isaac Shelby, the first Governor of Kentucky. At Hampton they will see the grave of Mordecai Lincoln,



Fine Mountain Section of Boone Way—On the Road from the Southeast to the Blue Grass Country

uncle of Abe Lincoln. All along Boone Way, and along the other great highways traversing the Southern Appalachians, they will find points of historic interest.

Those who do not care to try Boone Way before next summer are invited to read the following response to a toast offered by General N. B. Forrest to Landon C. Haynes, "the eloquent gentleman from East Tennessee, a country sometimes called 'God-forsaken'." The sentiments expressed apply to the entire country along Boone Way as well as to East Tennessee. Mr. Haynes said:

"Mr Chairman and Gentlemen: I plead guilty to the soft impeachment. I was born in East Tennessee, on the banks of the Watauga, which, in the Indian vernacular, means 'beautiful river', and beautiful river it is. I have stood upon its banks in my childhood and looked down through its glassy waters, and have seen a heaven below, and then have looked up and beheld a heaven above, reflecting like two mirrors, each in the other, its moons and planets and trembling stars. Away from its banks of rock and cliff, hemlock and pine, stretches a vale back to the distant mountains as beautiful and exquisite as any in Italy or Switzerland. There stand the Unicoi, the Roane, the Black and the Great Smoky Mountains, among the loftiest in the United States, and on whose summits the clouds gather of their own accord, even on the brightest day. There I have seen the great spirit of the storm, after noontide, go and take his evening nap in his pavilion of darkness and of clouds; I have seen him aroused at midnight, as a giant refreshed by slumber, and cover the heavens with darkness; I have seen him awake the tempest, let loose the red lightnings that ran along the mountain tops for a thousand miles, swifter than an eagle's flight in mid-heaven; then I have seen them stand and dance like angels of light in the clouds, to music of that grand organ of nature, whose keys seemed to have been touched by the fingers of Divinity in the hall of eternity, that responded in notes of thunder resounding through the universe. Then I have seen the darkness drift away beyond the horizon, and the morn get up from her saffron bed like a queen, put on her robes of light, come forth from her palace in the sun, and stand tip-toe on the misty mountain tops while the night fled from before her glorious face to his bed-chamber at the pole. She lighted the green vale and beautiful river, where I was born and played in childhood, with a smile of sunshine. Oh, beautiful land of the mountains, with thy sun-painted cliffs, how can I ever forget thee!"

#### National Road in Maps and Picturques.

The three hundred miles from Baltimore through Frederick, Hagerstown, Cumberland, Frostburg and Uniontown to Wheeling, W. Va., is the most historic thoroughfare in the United States, and the eastern division of the National Old Trails Ocean-to-Ocean route. For several years it has been studied in detail by Robert Bruce, of the staff of the American Automobile Association and the Automobile Blue Books, who has just brought out, under the name of "The National Road," a booklet of 100 pages, covering the route from the topographic, pictorial and historic standpoints. It is the work of a close student of the subject, who has spared neither time nor pains to go beneath the physical features which, however, are brought out with special clearness and good effect, to the stirring history and legend that center about the old turnpike from

Baltimore and Washington across the Alleghany Mountains to the Ohio River more than any other single road in America.

Perhaps the most notable feature of the booklet is the topographic mapping, which starts with a condensed profile of the entire route, showing principal elevations and grades in miniature, followed by three diagrams on a larger scale giving the relative locations of the several mountain ranges traversing the intermediate country. These lead up to the detailed maps, which are divided between the nine chapters, and show not only the local topography throughout, but the many historic landmarks and other features of interest to the touring motorist.

Each city and important town is mapped separately, to assist in quickly identifying points of local interest and to bring out with special distinctness the streets or avenues used in running through them by this route, or branching off by some important connecting road. All maps were prepared under direct supervision of the author, whose familiarity with the old highway has been gained by several trips over it, and personal examination of all existing landmarks. As a result, the "sense of locality" is imparted in an unusual degree to the careful reader; and the relation of topography to history most effectively brought out.

The descriptive text, supplemented by many well-chosen illustrations, probably reflects more research than has heretofore been given to any road subject of equal length in the United States. It is, in fact, an expert and enthusiastic interpretation of the route, likely to appeal particularly to the leisurely tourist who desires to get more out of his trip than a series of fleeting glimpses of the most conspicuous features. For the convenience of those who may plan to visit the National Capital, either to or from the West by this route, a final chapter—the "Baltimore-Washington-Frederick Triangle"—is added, with descriptive text and maps on the same plan as the Baltimore-Wheeling sections.

The fact that the National Road is now in first-class shape practically all the way from Chesapeake Bay or the Potomac River to the Ohio, and that many tourists are looking for new trips to take the place of their customary European tours, makes the publication of the book most timely. A careful reading of it is likely to convince one that American highways, especially these built along the lines of the old trails between the Atlantic seaboard and the central West or far West, deserve more careful and thorough treatment than they have received in the past. Copies at \$1.00 each postpaid, can be secured from the author, Robert Bruce, Clinton, Oneida Co., N. Y., who will be glad to correspond with any motorist intending to make all or part of that trip.

#### Blast River Bed With Explosives.

The citizens of Muskegon, Michigan had a lively Fourth of July. They had noise and excitement without a waste of effort.

A ton of nitroglycerine was placed in the old bed of the Muskegon river channel at Muskegon and exploded between ten and twelve o'clock. A number of prominent citizens of the city and state as well as transportation officials of all lines, entering Muskegon, witnessed the work, including Governor Ferris. The purpose of the blasting was to open 50,000 acres of the most fertile land in the state by providing means of transportation.

# Davidson County Leaves the Mud

**Red Mud Roads of North Carolina Community Converted Into Finest Highway System in the Entire State Within a Few Months**

**By E. E. WITHERSPOON**

**F**ROM the worst to the best roads in a great state is quite a step for any county to make within a year, but this is the claim of Davidson county, a claim that is generally conceded by those who have recently gone over a portion of her system of topsoil roads. Approximately a hundred miles of these roads were finished June 30th and about 120 miles were in course of construction or authorized on the same date.

Davidson county is not building roads just for today, but for tomorrow and every other day that follows. When a road is finished the maintenance men take up their task of keeping it finished. Along with the purchase of building machinery came the securing of maintenance tools, for the bill that authorized a \$300,000

where; but roads that would serve the most people and would lead them to the centers where the great heart of trade abides. Davidson county's development depends much on contact with its neighbors, so the road system is being constructed with the idea of neighborliness looming large. Forsyth county on the northwest draws the tobacco trade from Northern Davidson, because Winston-Salem is the foremost tobacco market in this part of the state, and Lexington, the county seat, is not even a market. Consequently four main roads will lead into Forsyth county when all are finished. Two of these are done, two in course of construction and two other connecting roads are contemplated that will also touch Forsyth, making six places in all that Dav-

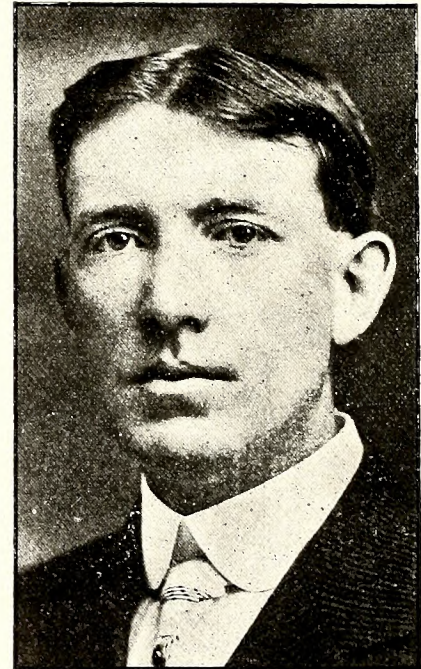


**E. E. WITHERSPOON**  
Managing Editor, Southern Good Roads Magazine

bond issue was wisely drawn. It was the first in North Carolina that had provided for maintenance in quite so adequate a manner. The fight was too long and hard to secure road for the friends of progress to risk having their work deteriorate and go to decay within a few years. The battle was also too desperate to take the chance of political road construction, so a non-partisan road commission was provided for and named in the bill. These men do not have to worry with the care of paupers or a thousand and one other small worries that make the job of the county commissioner at times a nightmare, consequently they have been enabled to devote their thought to getting the most and best roads for the least money.

## **Joins Neighboring Counties.**

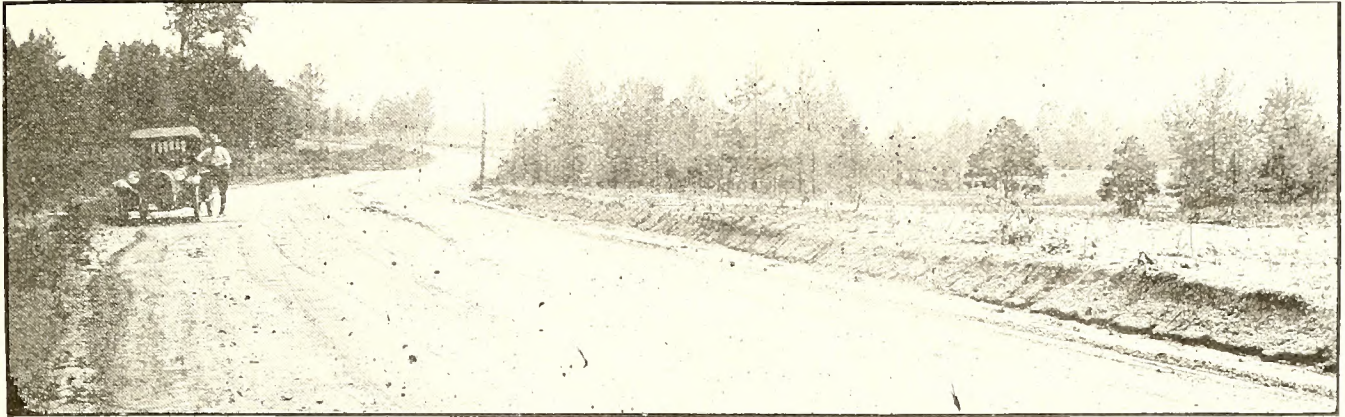
The bill provided that the roads built should not be a labyrinth of highways running everywhere and no-



**ROY T. BROWN**  
Resident Engineer, Davidson County, N. C.

idson and Forsyth join their industrial life. Guilford county, on the northeast, does not extend far along the border line, but two roads link Davidson with this county, one of these being the route of the State Central Highway and the Southern National Highway. A road of national importance is also included in those joining Forsyth, this being the National Highway from Atlanta to New York, furnishing the most direct route between Lexington and Winston-Salem.

Randolph county, lying to the east, skirts the border of Davidson for about thirty miles and along this stretch four roads lead into Randolph, and four Randolph good roads come out to meet them. One of these is the Pinehurst-Winston-Salem Highway, while another directly joins Lexington and Asheboro, two principal towns of the two counties, then swinging around in a triangle links High Point, principal furniture city of



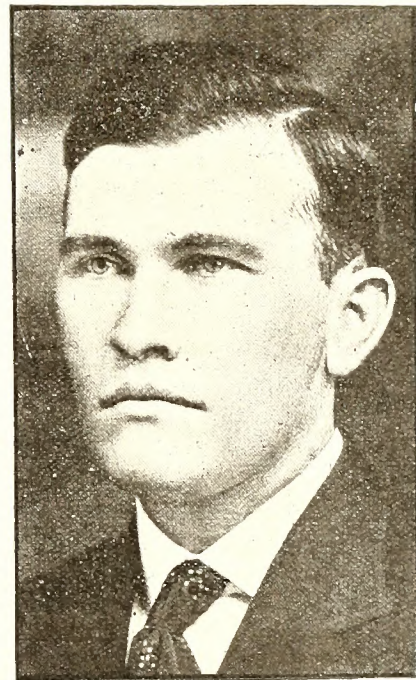
Lexington-Winston, N. C. Road, Showing Reverse Curve. All Curves Banked for Motor Traffic. J. E. Everhart, Patrolman

the South, and comes back to Lexington, passing through Thomasville, an important furniture making city and second town of Davidson county.

Rowan county on the south is already connected with both at the Yadkin River bridge and at Grubb's Ferry, while another road is contemplated further south at Long's Ferry. The connections with Rowan, however, are thus far not so satisfactory as those with Forsyth, Randolph and Guilford, for here there exists a formidable dividing line provided by nature—the Yadkin river. Although three great highways are officially routed over the road that leads through Davidson to the Yadkin River, a toll bridge at this point, stands as a great barrier to both pleasure and commercial travel. Just at present there is much agitation looking to doing away with this barrier of free intercourse and the friends of progress are hopeful that this condition of affairs will soon be relegated to another century, where it rightfully belongs among the dead things.

Going further north on the Yadkin, Davidson county meets the good roads system of progressive little Davie county at Fulton's Ferry, near Yadkin College. There is a ferry here in pretty good shape, but the days of ferries on principal highways is past. Recently it took three hours for all the carriages and motor cars that assembled here at one time to be taken across the river. Time is worth too much these days to busy people to much longer allow such a time and money killer as a ferry to stand in the way. Another thing that will likely contribute toward hurrying forward the building of an inter-county bridge at this point is the coming of the Boone Highway from out the West. The parents of Boone rest in a cemetery just across the riv-

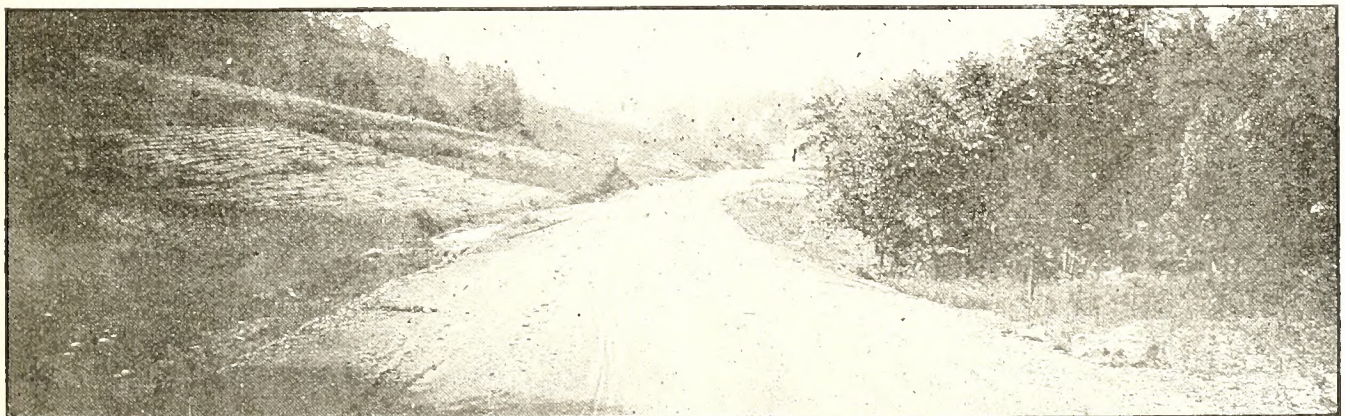
er in Davie, while Boone Memorial Park, conceded by many historians to be on the site of the old home place



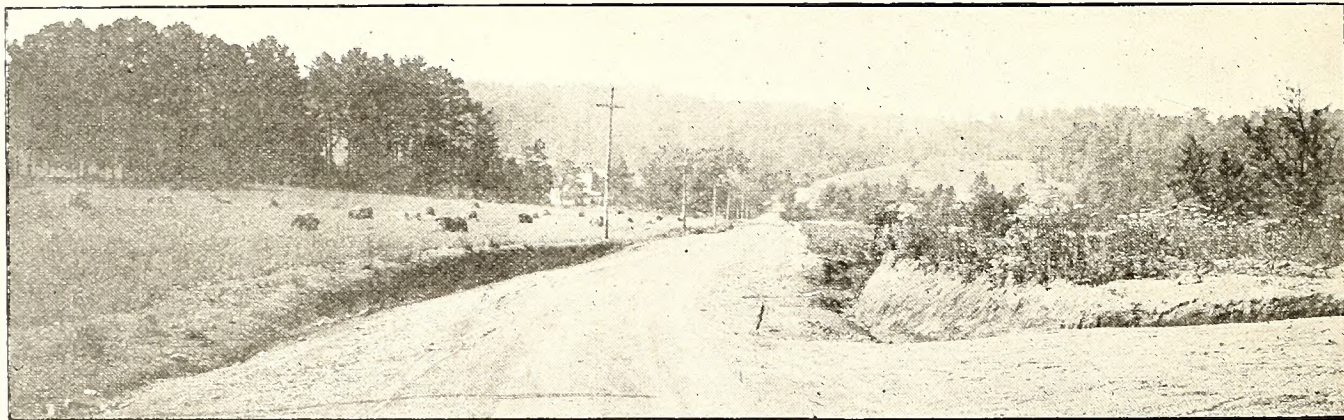
J. F. MULLIGAN

Superintendent of Construction, Davidson County, N. C.

of Boone in North Carolina, is not far away from this ferry on the Davidson side. Other roads leading off



Thomasville-Cid, N. C. Road. Surfaced with Slate. J. R. Watford, Patrolman

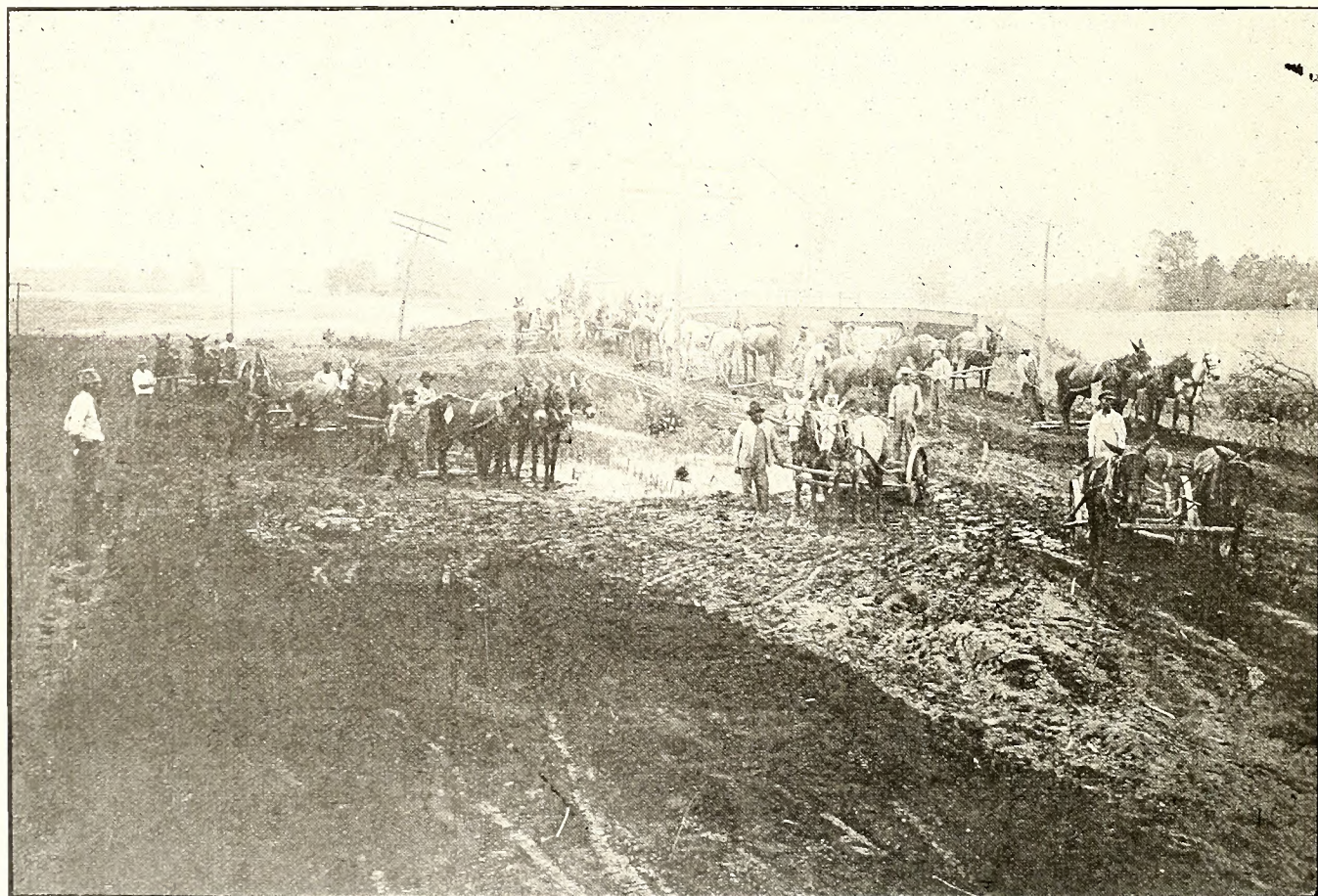


Thomasville-Denton Highway, Showing Engineering Difficulties in Background. No Grade on this Road Exceeds four per cent  
C. L. Welborn, Patrolman

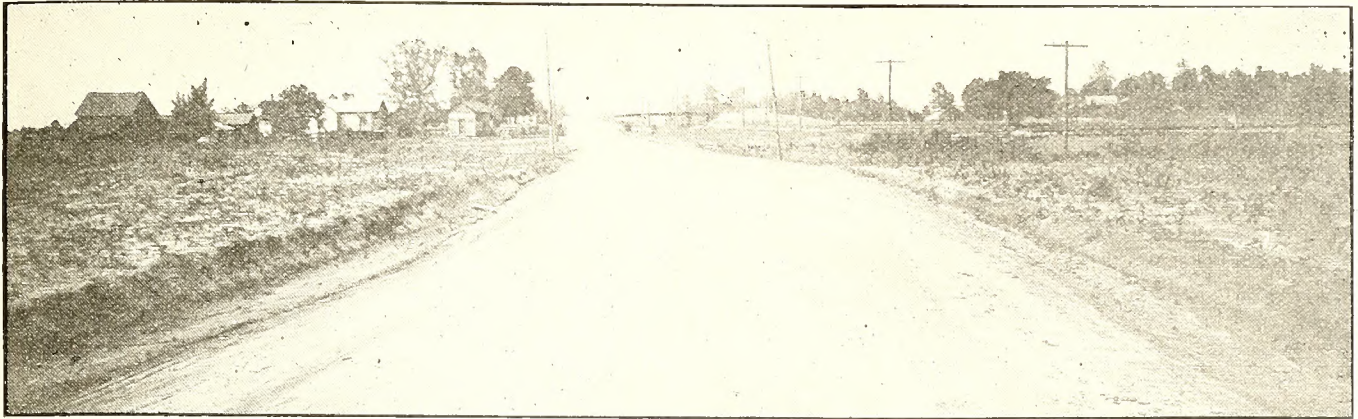
the Boone Highway will take the traveler to this picturesquely wild and beautiful spot, a place so near to nature that the visitor wonders if still the spirit of the intrepid hunter and courier of civilization does not haunt the place.

This now makes fine connections with every county touching Davidson, with the exception of Montgomery, and it is contemplated to extend one of the main roads of this county south to the Montgomery line and then for that county to build on down to the Narrows of the Yadkin, the site of the greatest electric development in this section of the nation, the giant dam and aluminum works at Badin. Montgomery, however, is the only county touching Davidson to any appreciable extent

that does not have a correlated road system. But Montgomery expects to have such within the next few months, for the people there are anxious to tie to their neighbors across the line in Davidson. Already a road is being built just inside of the Davidson line that will give a gateway to some of the folks down in Montgomery. This section is very rugged and in some places heavy grading has to be done, yet good engineering has cut down the estimated cost in many places in the southern part of the county. Another item that enters here to reduce cost is that the soil at some places here has just enough slate and other substances as to make an almost perfect road surface when graded and crowned.



Construction Force No. 1 Southmont Road—Davidson County, N. C.



Lexington-Winston Section National Highway. J. E. Everhart, Patrolman, Davidson County, N. C.

On June 30th, the engineer of the road commission, Mr. Roy T. Brown, and the superintendent of construction, Mr. J. F. Mulligan, furnished data showing that already there was in round numbers 100 miles of road, completed and in full use. Approximately 52 miles was already graded and surfacing begun or contemplated within a few weeks. The amount of authorized road on which work has not yet begun was something over 66 miles. Other small items of construction not included in this brings the total well up to 220 miles of good roads out of the \$300,000 bond issue.

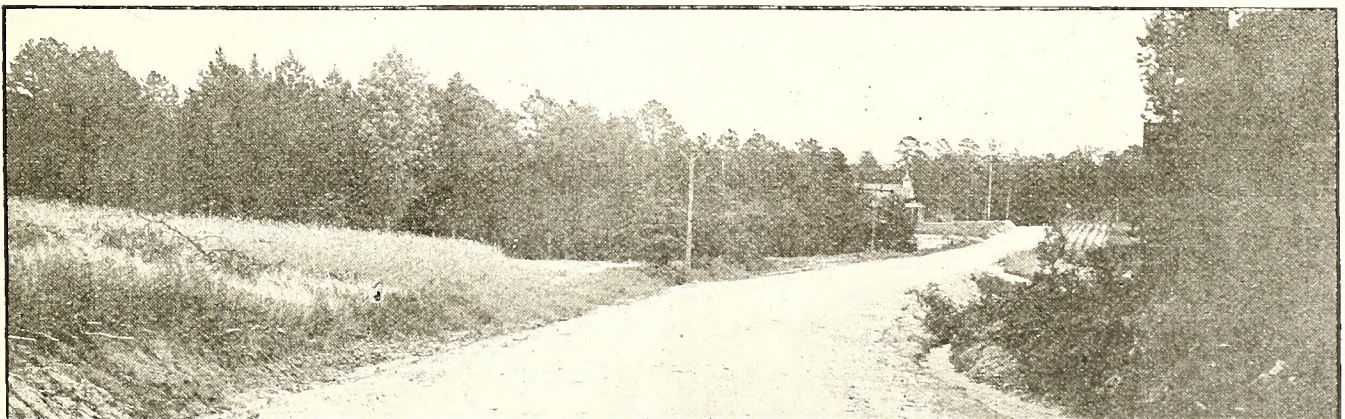
When it is taken into consideration that it requires 47 bridges of modern construction to be built on these highways and \$30,000 worth of machinery for construction and maintenance, the record made is little short of remarkable. Twenty-nine of these bridges were already completed June 30th, the masonry was in for 10 others, and 8 more were yet to be begun. The total length of the bridges will be approximately 3,130 feet, nearly three-fifths of a mile if stretched end on end. Steel and concrete are the principal elements of construction, many of the larger bridges having steel and concrete floors, while most of the smaller ones carry wood floors. The average cost is about \$15 per foot, making the total cost around \$40,000. The longest bridge in the county is 320 feet long, spanning Abbott's Creek a mile east of Lexington on the Lexington-Cid road.

The Lexington-Cid road is one of the most remarkable roads in this section. It contains the longest bridge in the county. The heaviest construction in the county was on this road about a mile east of Lexington, but it also contains the lightest construction in the

county, and that across a mountain. To cross Three-Hat mountain the engineers managed to find a route that necessitated the removal of only 700 yards of dirt and rock in a third of a mile. An excellent grade is secured at this point, and the dirt moved had only to be taken from the upper side the road to the lower. The scenery along this route is as fine as will be found in Piedmont North Carolina and the wonderful curves on this road gives a splendid finish to the work of nature.

#### The Central Highway.

The principal highway from the point of travel is the Central Highway running through the entire length of the county from the Guilford county line to the Yadkin River. Twenty-four miles of this road has been built and finished by the present road commission. The roadway is 30 feet wide, with the bridges of steel and concrete entirely, with the exception of several fairly new bridges with wooden floors that it was not considered economical to rebuild just yet. Maintenance has been in force on this road for nearly a year in some places, and on its entire length since construction was finished about ten months ago. Much of the territory traversed by this road is of red clay subsoil, and it easily sustained its reputation through many years as the worst through highway in Piedmont North Carolina. It used to be necessary for a traveler upon reaching Salisbury or High Point to telephone down into Davidson to see if it were possible to come through. It was a nightmare to tourists, and those who had to hire mules were legion. Many people who lived along this road charged exorbitant prices for pulling the stranded motorist from the mire, and many are the men who have dropped five dollars in these former Davidson county



Thomasville-Lexington Section Central Highway. Top-Soil Surface. C. S. Sink, Patrolman

mudholes. The old "Granny Conrad Hill," about midway between Lexington and Thomasville, gained wide reputation as a terror to all sorts of traffic. A fine concrete bridge across the creek there, good engineering and grading has sent the "Granny Conrad Hill" to abide with the unpleasant memories.

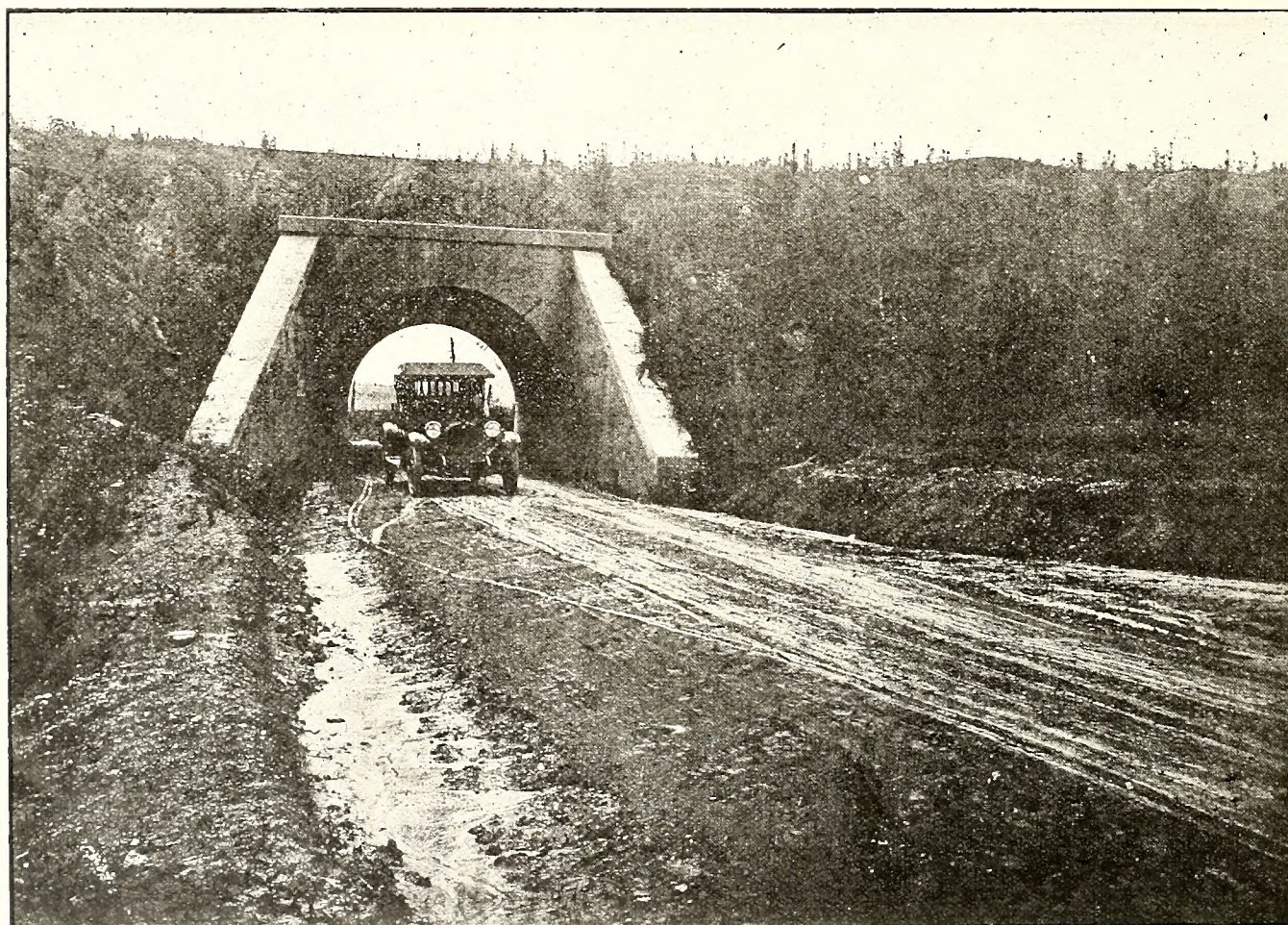
This piece of road is now being placed under the Federal system of maintenance and is in charge of Engineer W. L. Spoon, of the United States Office of Public Roads. Two patrolmen will have charge of the entire stretch through the county, with five maintenance men. Instead of meeting the inhospitality of mud when entering the county on this road from either direction, the traveler will be greeted by a large sign reading "Welcome to Davidson County," and giving our road status, population and area. When he leaves, instead of showering curses on the despicable muddy hills, the tourist will be given this pleasant reminder from the other side of the sign board—"Davidson County Invites You Back—Enjoy Our More Than 200 Miles of Good Roads."

#### "Gouging" the Road Funds.

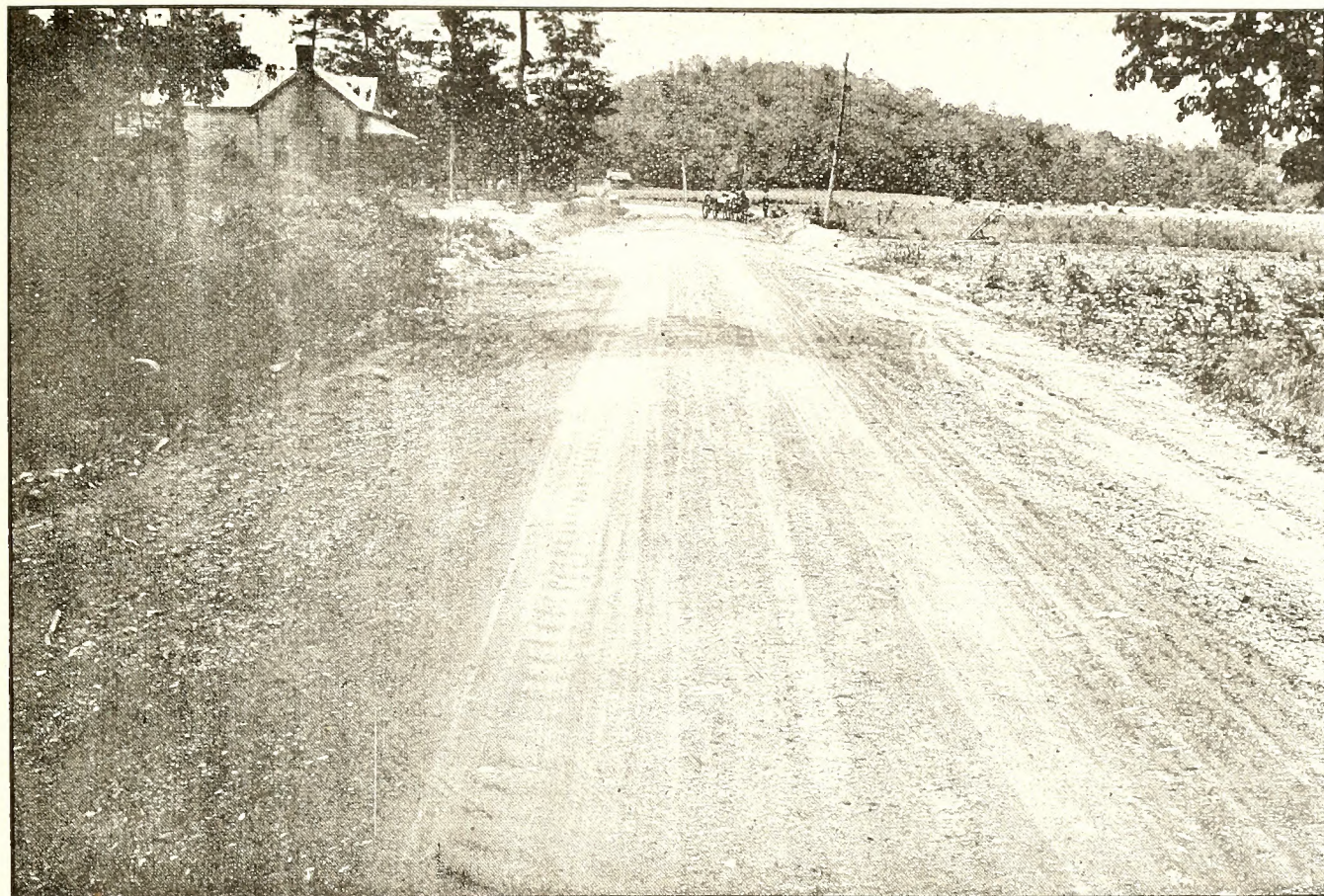
A sign similar to the ones just described will also be placed at the Forsyth-Davidson line, where the National Highway enters. This road is built to the Forsyth line from Lexington, a beautiful road for 14½ miles, with three maintenance divisions. However, Forsyth has not yet filled in the link of about five miles to Winston-Salem, so motorists have been detouring to the left near Eller and meeting the Winston-Salem and Salisbury road, a badly worn tarvia macadam, on the For-

syth side. There is probably a reason though that should be given in justice to the Forsyth commission, the same trouble that Davidson authorities met with. On the Davidson side more difficulty was met with in getting right-of-way and top soil than on any other road in the county, and practically every suit for damages now pending in court comes from along this road. The people on the Forsyth side are reported to have been trying to work the same racket, thinking the road would have to be built anyway. A new railway was built along here a few years ago and many landowners received handsome sums for right-of-way, and it whetted their appetite, it would appear.

Through this end of the county and leading to Winston-Salem, a top soil road is now in course of construction from Thomasville to the tobacco town. It opens up a wonderfully rich farming section and gives a better outlet for tobacco growers. A recent revision of the tax books shows that farm property in this section, where there are no towns, shows an increase of approximately \$40,000. A road from Thomasville, practically finished, also leads into the National Highway near the Forsyth line. From off the National Highway further south a road is to be built through Arcadia to join the Winston-Salem and Salisbury road. This route leads through a fine dairying and wheat growing section. The Winston-Salem and Salisbury route in Davidson county is expected soon to be built in its entirety, through the construction of links connecting main county roads leading toward Lexington. The people of this section have been very liberal in their offers of cooper-



Lexington-Linwood Road, Showing Southbound Railway's "Safety First" Crossing—Davidson County, N. C.



Thomasville-Denton, N. C. Section of Winston-Pinehurst Highway, in Davidson County

ation, giving free right-of-way, top soil, and much team work and labor in some instances. It may be remarked just here that the people in the outlying districts, who get 22-foot roads, have shown a much better spirit than those along main roads, who receive 30-foot roads and whose property is increased to almost prohibitive values by being on the main highways, and consequently made practically suburban properties. Enough aid has been voluntarily given to complete at least ten miles of roads.

#### **Real Maintenance Provided.**

The question of maintenance should again be mentioned here. As stated before, the tax was made sufficient to take care of maintenance work on all the roads, and wherever a road has been finished it has been turned over to the man with the drag, the shovel and hoe, and after each rain the road is carefully gone over. If a freshet comes along and does severe damage somewhere or endangers traffic at any point, the patrolman or maintenance man on that section either telephones to Lexington or hurries into see Engineer Brown or Supt. Mulligan, and the trouble is quickly righted. As all the roads are not yet done, the number of maintenance men and patrolmen of the county cannot be given, but up to June 30th seventeen of these had been put to work. About \$25,000 of the equipment purchased for construction work is of such nature as to be used in maintenance, and it will be more economical for the county to keep this for this purpose than to sell and invest in new roads.

#### **Construction Done Properly.**

The processes of construction have been watched with religious care, it being realized that the grading

was the really permanent work, and, therefore, of the highest importance. The pictures illustrating this article will show some of the difficulties met with in many sections, especially in mountainous parts. Much heavy work was required upon the road running south from Thomasville to Cid, Denton and on to High Rock. Some of this was entirely of steam shovel construction. Mr. J. F. Mulligan, superintendent of construction, has had direct oversight of this work in all parts of the county, under the direction of the engineer of the commission, Mr. Roy T. Brown. The question of drainage was given its proper weight and culverts and piping were not spared, as it is cheaper to buy these at the start than to have to rebuild a road washed away. Nor was the water allowed to run so far on a hillside ditch, as to wash heavily and produce gulleys beside the road. To prevent such the water was switched across the road at frequent intervals by piping under the surface. A difficult thing to secure was the proper banking of curves for motor traffic, as the outside curves looked high enough to the contractor, but soon settled until too low. In some places the contractors were required to go back and add more dirt. Other curves are being and will be built up by the maintenance crews. The county road forces, contracting forces and hired labor were all used to do the construction work. Good engineering, of course, laid the foundation for proper construction.

Much of the soil of the county is either of a red loam or rocky and difficulty was encountered at several points in securing proper surfacing. One road in particular, that leading from Linwood to Lexington, presented such problems. For about a mile gravel was hauled from the abandoned track of the Southern Rail-

way, while for two miles south of this stretch feldspar and quartz was secured from one pit. This surfacing material is splendid and can easily be kept very smooth, and it does not readily wash. In other sections, especially on the Thomasville-High Rock division as shown by the photographs, slate was used as dressing material and some sections required only to be dragged, the natural mixture of clay, slate and gravel being such as to make a fine surface.

#### **A County That Waked Up.**

There have been many difficulties and worries to overcome and some obstacles have been thrown in the way of the road builders, but as a whole the people of the county realize how long they have been sleeping on their birthright and have awakened to a new consciousness. This county produces more wheat and more hay than any other county in North Carolina, and it is among the leaders in the production of corn. Just now dairying is securing a firm hold, and a creamery recently established at Lexington, by a group of farmers, has been showing a regular monthly increase in production of 30 per cent. Within the past two years the growing of crimson and red top clover has increased 55 per cent. With the decrease in the cost of production and marketing has come a corresponding increase in the amount produced. For many years there was an exodus of the best young men from many of the mud-bound sections, and the West gained our youth by the hundreds. Already these are beginning to return to their old home, where new opportunity beckons through an intensive agricultural development that was not possible without good roads. The future is going to require many more roads than can be built out of the \$300,000, which is nearly completing its splendid service, but there is confidence among all classes that Davidson county is not ready to stop now, for no county can stop without going backward—and Davidson is not traveling that way any more.

#### **Illinois County Makes History.**

Twice during the present year Vermillion county, Illinois, of which Danville is the county seat, has made history. On March 17, contracts were awarded by the county mentioned for the longest mileage of concrete roads ever let, nearly 145 miles of paved highway built for permanence, built to outlast the \$1,500,000 bond issue that made these roads possible.

Vermillion county taxpayers, not to mention those from adjoining counties and elsewhere, will long remember the occasion of dedicating the first stretch of these roads to the use and service of the people of Il-

linois—an event which took place on July 20. On behalf of the state, Governor Dunne accepted this stretch of road. Five thousand farmers and business men witnessed the ceremony which, in days to come, will be looked upon as a great chapter in Illinois history. Governor Dunne made the prophetic statement that in time a tablet would be placed at the roadside to commemorate the historic fact that July 20, 1916, was the day when the people of Newell township, Vermillion county, completed and presented to the commonwealth of Illinois the first stretch of permanent highway made possible under the issuance of bonds for that purpose, in cooperation with state funds allotted under the state aid road law.

#### **Link in Appalachian Highway.**

The activity of good roads boosters reported in Tucker county, W. Va., which centered around a mass meeting in Thomas is creating much interest. The building of good roads in Tucker and Preston county, W. Va., will supply one of the missing links in the Appalachian highway which is to extend from Maine to Louisiana along the crest of the Appalachian mountains.

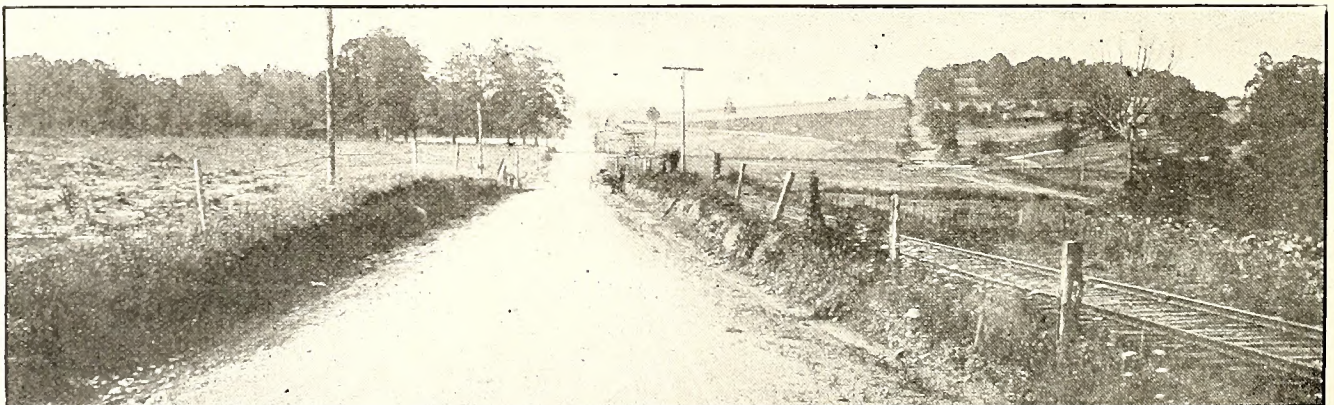
Since the new road system in West Virginia will be connected to the Maryland highways near Oakland it is an assured fact that the Appalachian highway will traverse the National pike between points close enough to Frostburg and Cumberland to make the project a matter of very great interest to Alleghany county people.

The Southern Appalachian Good Roads Association, is backing "The Appalachian Highway," one of the newest of the great through routes to attract public attention.

The project was launched at the Southern Appalachian good roads convention held in Bluefield, W. Va., October, 1915.

The route selected begins at Calais, Maine, and runs via Bangor, Maine; Montpelier, Vermont; Lake George and Albany, N. Y.; Williamsport, Pa.; Oakland, Md.; Elkins and Bluefield, W. Va.; Bristol, Tenn.; Asheville, N. C.; Birmingham, Ala., to New Orleans. The route follows the chain of the Appalachian mountains and it is claimed that the highway will be the most beautiful from a scenic standpoint to be found anywhere in America.

Chatham county, Ga., has advertised for bids for the construction of the first mile of concrete road in that county. It expects to accomplish the work for \$6,000. Construction will be similar to that in California.



Thomasville-Cid, N. C. Near Cedar Lodge. Road surfaced with Slate. Old Road on Right of Railroad. J. R. Watford, Patrolman

# Apportionment of \$5,000,000 Federal Road Funds to the Several States

The Secretary of Agriculture under date of July 21, 1916, certified to the Secretary of the Treasury and the governors and state highway departments of the several states the following apportionment of the \$5,000,000 of federal road funds available for the fiscal year ending June 30, 1917. This is the first installment of federal moneys to be apportioned to the states under the Federal Aid Road Act approved July 11, 1916. Before making the division among the states, the secretary, in accordance with the act, deducted 3 per cent or \$150,000 needed for administering its provisions. This left \$4,850,000 to be apportioned among the states, one-third in the ratio of area, one-third in the ratio of population, and one-third in the ratio of mileage of rural delivery routes and star routes. The apportionment on this basis gives the following amounts for the several states:

Alabama	\$ 104,148.90
Arizona	68,513.52
Arkansas	82,689.10
California	151,063.92
Colorado	83,690.14
Connecticut	31,090.44
Delaware	8,184.37
Florida	55,976.27
Georgia	134,329.48
Idaho	60,463.50
Illinois	220,926.23
Indiana	135,747.62
Iowa	146,175.60
Kansas	143,207.40
Kentucky	97,471.91
Louisiana	67,474.66
Maine	48,451.50
Maryland	44,047.22
Massachusetts	73,850.95
Michigan	145,783.72
Minnesota	142,394.06
Mississippi	88,905.84
Missouri	169,720.41
Montana	98,287.19
Nebraska	106,770.81
Nevada	64,398.30
New Hampshire	20,996.62
New Jersey	59,212.68
New Mexico	78,737.81
New York	250,720.27
North Carolina	114,381.92
North Dakota	76,143.06
Ohio	186,905.42
Oklahoma	115,139.00
Oregon	78,687.37
Pennsylvania	230,644.17
Rhode Island	11,665.71
South Carolina	71,807.64
South Dakota	80,946.02
Tennessee	114,153.48
Texas	291,927.81
Utah	56,950.15
Vermont	22,844.47
Virginia	99,660.71
Washington	71,884.28
West Virginia	53,270.46

Wisconsin	128,361.97
Wyoming	61,196.82
Total	\$4,850,000.00

## Later Appropriations.

The apportionment indicated above is only of one year's funds. For succeeding fiscal years the act appropriates the following amounts:

1918	\$10,000,000
1919	15,000,000
1920	20,000,000
1921	25,000,000

The act requires that the apportionment for each year shall be made in the same manner. Different sums are appropriated for each year and the apportionment must also take into consideration the population as shown by the latest available federal census and the mileage of rural delivery and star routes as shown by the certificate of the Postmaster General for the next preceding fiscal year. A new apportionment, therefore, must be announced for each fiscal year.

The apportionment as given above does not take into consideration the \$1,000,000 additional appropriated each year for ten years for the development of rural roads in the National Forests.

## Road Oiling in Tennessee.

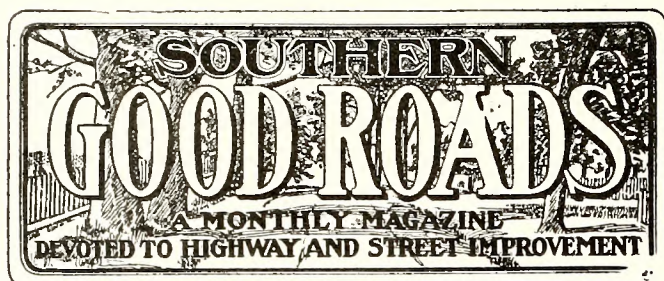
Because the state highway commission secured an exceptionally good price recently in contracting for the delivery of approximately 750,000 gallons of road-building oil, many counties and towns, not included in the big bid, are sending in requests for orders to be filled. These will be able to secure the oil at the contract price.

On seeing that many other sections not included in the bids were interested and wished to secure varying quantities of the oil, the highway commission has sent out letters to officials in nearly every county and large-sized town in the state, telling them that they can place their orders through the highway commission. It is expected that the additional orders will bring the total up to something like 100,000 gallons.

The heads of the highway commission feel elated over the price at which they were able to secure the oil. It is said to be one cent lower on the gallon than any other state has been able to secure.

This road-building oil is very thick, almost a solid, and before being applied to a road is subjected to 250 degrees heat. After being placed while hot on the roadbed it is covered with building substance and rolled, after which fine rock screenings are laid over it. Chief Clerk West of the highway commission said that when completed, an oil-built road of this type would be practically such a roadway as the Capitol boulevard.

The Leadville district, near Elkins, W. Va., is beginning construction out of the proceeds of \$220,000 bonds just issued. The adjoining district in Barbour county has voted \$100,000. These districts are to build a portion of the Appalachian Highway from Bristol to the Great Lakes.



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**Official Organ Southern Appalachian Good Roads Association**

DR. JOSEPH HYDE PRATT, President, Chapel Hill, N. C.  
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**Official Organ of the South Carolina Good Roads Association**

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FINGAL C. BLACK, Secretary, Columbia, S. C.

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**ATTEND THE LEXINGTON MEETING.**

The Southern Appalachian Good Roads Convention will meet in Lexington, Ky., on September 5th and every good roads man in the Appalachian states who can do so with convenience should be there. The past year has witnessed the construction of many hundreds of miles of splendid roads in the territory embraced in this association. In fact we do not know of another section of the country that has surpassed it, all things being considered. No longer are the hills and mountains barriers to human intercourse. Good engineers can find grades on which to build roads that will carry the travel and commerce of this section with ease. The war in Europe has convinced our American people that they ought to do a little sight-seeing at home before they plan a trip abroad. We are building in our Southern Appalachians just as good roads as can be found in the Alpine country or in the Pyrenees, and here we certainly have as splendid scenery.

However, the work of developing our resources is just now well under way, and should be pushed with unceasing vigor. The Lexington meeting is going to deal with some very vital problems. Federal Aid is in sight now, and this will give a greater impetus to mountain road building than in probably any other sections. Many of our mountain people have been anxious to build roads, but did not feel quite equal to the

task without a little outside aid, but now these are given their chance.

The good roads official or enthusiast can hardly find a more pleasant spot on earth in which to spend a few days this summer than in the famous Blue Grass region of Kentucky, where beauty, happiness, prosperity and a hospitality famed the country over is to be found. This ought to be the very best of all the meetings yet held, for the record of the past year is better than ever before and the opportunity for the years immediately ahead is certain brighter than before contemplated.

**CONNECT LYNCHBURG AND ATLANTA.**

Rockingham county, North Carolina, now has a fine opportunity to benefit its own citizens and the South Atlantic states as well. This is a county of especially rich farming resources, lying in the famous bright tobacco belt. Its soil is especially adapted to the construction of fine topsoil roads at a very moderate cost, but it has some very poor roads—in fact many miles of them. One road running through the entire width of this county is of especial interest to interstate traffic, this being the Greensboro and Danville road. In the summer time motorists can make the trip to Danville with little inconvenience, although the holes are not attended to and in rainy season some mud and many ruts are found. If Rockingham county would get busy and build this road from the Virginia line to the Guilford county line another through highway would be opened up; this leading from Lynchburg, through Danville, Greensboro, Lexington, Charlotte, Spartanburg, Greenville and on to Atlanta.

On both sides of Rockingham county are long stretches of good roads which would benefit the people of this section much more if Rockingham would do her duty. From Danville to Lynchburg there is excellent road practically all the way. From the Guilford line to Greensboro is a fairly good road, but in need of maintenance. From Greensboro to High Point is a concrete road. Three miles south of High Point is worn-out macadam, that badly needs fixing, but which is expected soon to be remedied. In nearly all the counties between Guilford and Atlanta this highway will be found in splendid condition. One glance at the road map will convince anyone that this is a very important road and should be surfaced. It would also open the way for the extension of this road from Lynchburg to Washington.

**BIG ROAD LOSS IN NORTH CAROLINA.**

Many of the western North Carolina counties sustained tremendous losses in the floods of July, which swept away probably more than a million dollars worth of fine highway bridges. Many great fills, built at heavy cost in the mountainous country were swept away by the waters, which rose to heights far above anything known in the records of the counties or in the legends of the mountain people. Gaston county estimates a loss of upward of a quarter million dollars to roads and bridges. Two fine highway bridges between

this county and Mecklenburg, spanning the Catawba river, went away. One of these, the Sloan's Ferry bridge, was of concrete, reinforced with steel. It was considered the finest highway bridge in the South Atlantic states. It was a complete wreck. The bridge at Rozzelle's Ferry, between Mecklenburg and Lincoln, likewise of concrete, was also lost. In fact every highway bridge over the Catawba river from the mountains to the South Carolina line, for nearly two hundred miles, was swept into the stream. Buncombe, Rutherford; McDowell, Caldwell, Catawba, Burke, Henderson, Wilkes and many other counties where much good roads construction had taken place suffered tremendous losses.

The Central Highway of North Carolina, not yet completed, suffered much loss above Morganton but this can be repaired. The highway that suffered worst probably was the Charlotte-Asheville road. For ten miles or more in Rutherford county it could not be passed with a horse for days after the waters began going down. The loss on this highway alone in Rutherford and Henderson will probably be a hundred thousand dollars. It will of necessity be several years before all the damage can be repaired in some of the mountain counties. Ferries have replaced some of the bridges, while the work of rebuilding others is already under way. It is understood Gaston and Mecklenburg will rebuild both bridges quickly as possible. The Sloan's Ferry bridge is on the National Highway and Charlotte-Asheville route. The rains were of unprecedented violence and continued for days. From available reports it seems that the sand clay and topsoil roads, most of which were on crests, suffered the least damage from washing.

The larger bridges lost were on the Yadkin, Catawba, Broad, French Broad, Swannanoa and their larger tributaries. Hundreds of smaller bridges were lost in a dozen or more counties. It is likely that the stricken counties will apply for Federal and state aid in rebuilding the roads. So much property loss was sustained in some of these communities that it would appear that outside help will be absolutely necessary if the highways are to be rebuilt.

#### **\$800,000 Bond Issue for Brooke County, W. Va.**

On Tuesday, June 20th, the voters of Brooke county, W. Va., poured out in such numbers as rarely seen in an election of any kind in that community and carried an \$800,000 bond issue for good roads by a majority of 111 over the required three-fifths of the vote cast. The people showed their progressiveness by giving such a good margin for so large a sum, when they were laboring under the handicap of the three-fifths rule. The magnificent victory was due largely to the effective organization of the proponents of good roads. Literature was sent broadcast over the county until every voter was reached. The ladies in Brooke county realized what the success of the road issue meant to them, so they got out and took an active part in the campaign right up to the time for the polls to close, and none in the community were happier than these when the result was announced.

#### **Interest in National Highway Link.**

There is much interest in the outcome of a bond issue for \$200,000 to be voted on shortly by Carroll county, Va. This issue, if it carries, will furnish the funds for completing a very important link in the National Highway down the Shenandoah Valley, thorough Roan-

oke, and Martinsville, in Virginia, and on through Mount Airy, Winston-Salem and to Lexington, North Carolina. A big mass meeting was scheduled for Hillsville, at the famous "little red court house," the 10th of this month. Lexington, Winston-Salem and Mount Airy have been planning to send delegations to this meeting. President H. B. Varner and Secretary Joseph Hyde Pratt, of the North Carolina Good Roads Association, have been placed on the roster of speakers. Much of Virginia and North Carolina, as well as states north and south of these, are interested in the outcome of this election. For some time the usefulness of the National Highway through this section has been curtailed very much on account of the bad road in Carroll. Indications are that it will carry by a good majority.

#### **Drag The Road Club.**

This is a day of clubs and organizations. We have corn clubs, Tomato Clubs, Pig Clubs, Church Associations, Sunday School Associations, Reading Circles, and other organizations tending to lift and help the community. These are all good organizations and are doing much for the betterment of society and living conditions of today, but there is one item that is of vital interest to everyone and that is the road over which every member of these several organizations must pass. At the present time in many parts of the country this is being left with but little thought. The mail must be carried over it. The food must be gotten over it. Every meeting of either social or religious nature must be made up of persons who pass over the road. Then let us think about the road in our other gatherings. It would be time well spent to have a few meetings in the rural communities to discuss ways of improving the road. There are many ways this can be done, but the most feasible and quickest is to drag the road. This is simple, and a road dragging club in every community will be the means of accomplishing this end. The State Road Bureau has prepared a bulletin on dragging the roads and shows how to make various kinds of drags. Split logs make good drags, square timbers, plank, railroad iron, and many other waste materials can be used to make good drags. The drag is the cheapest method of maintaining an earth road. It will do more work for fifty cents than can often be done for fifty dollars with pick and shovel. We need good roads in every state and if we are to get them, every dollar of money and energy applied to the roads must be done with a view of getting the most efficient results.

#### **Arcadian Highway Dreamed.**

With the receipt of a letter from T. Coleman Du Pont, chairman of the board of the National Highways Association, Miss Lillian Stuart, promoter of the Arcadian highway, expressed confidence that her dream of an \$80,000,000 highway from Detroit to New Orleans would be realized. Cash subscriptions aggregating \$13,000 had already been raised and \$100,000 had been pledged.

A portion of Du Pont's letter follows:

"The thing that impresses me the most is the great social and economic value of an adequate system of highways for the people of the United States. Not only could the construction of such a system of highways be utilized to take care of the unemployment problem throughout the nation, but could likewise be utilized as a vehicle to eventually make our government self-supporting."

# West Virginia Wide Awake

**Many Counties Spending Large Sums to Build Modern Highways—  
Money to Be Spent Counted in Millions**

**By A. D. WILLIAMS, State Highway Engineer**

**T**HAT west Virginia is awake to the cause of better roads is evidenced by the amount of funds that have been appropriated and voted during the past two years. On the 20th of June Brooke county voted a bond issue of \$500,000 bringing the total available funds for road purposes up to more than \$10,000,000 and the total authorized bond in the state up to \$12,388,500. All of this amount has been voted since November 1911 and \$11,508,500 has been voted during the past two years.

On June 26 the county court of Preston county received bids on work in Portland and Kingwood districts aggregating 50 miles of improved road. H. H. Feller, Terra Alta, engineer in charge of Portland District, J. K. Monroe Kingwood, engineer in charge of Kingwood District.

On June 29 the county court of Wetzel county received bids on Church district road improvement aggregating 15 miles, improvement to be made of brick, concrete or asphaltic surface, J. Russell Wilson, Mannington, engineer in charge.

On July 1st the county court of Randolph county received bids on 22 miles of road construction, surface to be concrete, asphaltic concrete, brick, and macadam, P. B. Broomfield, Elkins, West Virginia, engineer in charge.

On June 17 the county court of Ritchie county sold \$240,000 Clay district bonds to Otis & Company at a premium of \$1805 and will advertise for bids on 18 miles of construction as soon as plans and specifications can be prepared, W. D. Britt, Clarksburg, in charge.

The county court of Wood county has recently sold \$70,000 Tigart district bonds at premium of \$100 to the local banks in Parkersburg. Work will be done by force account under direction of Burdette Woodyard county engineer, who has proven himself a master at constructing concrete road.

The county court of Boone county sold \$240,000 Spencer district bonds to Harris Forbes & Company at a premium of \$650 and the blank bonds.

On July 8 the county court of Greenbrier county received bids on \$153,500 Lewisburg District bonds and \$90,000 White Sulphur District bonds.

On July 24 the county court of Fayette county received bids on District bonds, \$600,000 Fayetteville, \$175,000 Falls, \$100,000 Nuttall, \$175,000 Sewell Mountain.

The county court of Raleigh county has recently sold \$835,000 Shady Spring, Trap Hill, Slab Fork, and Town District bonds at a premium of \$10,742.50 and are now preparing to carry out the necessary arrangements to start the construction.

The county court of Summers county has awarded the contract for 8 miles of asphaltic concrete the Central Engineering Co. at Charleston, W. Va., F. K. Rader, Lewisburg, Phillip J. Konrad, Kanawha Falls, engineers in charge.

The county court of Hancock county has recently sold \$125,000 Grant District bonds, \$50,000 Poe District bonds, \$40,000 Clay district bonds and are now having

surveys made preparatory to advertising for bids, C. M. Crafton, New Cumberland, engineer in charge.

Logan district Logan county has voted \$200,000 5% serial bonds, F. M. Wilson, county engineer, Logan, W. Va., is making surveys and preparing plans and specifications.

The county court of Doddridge county has decided to do the work in Grant district under the \$175,000 bond issue by force account and have employed Arthur Lucas civil engineer of Morgantown, W. Va., to take charge of the work. The same county has rejected all bids on the West Union district work excepting the bid of Sizler & Morae who have been awarded the contract for 4 miles.

The citizens of Lubeck district, Wood county, New Creek district, Mineral county and Piedmont district, Mineral county, voted on \$385,000 of bonds Saturday, June 24.

## How Great Highways Pay.

The actual, present value of the Lincoln highway to the cities and communities along its course has grown to proportions which, taken as a whole, runs up to an enormous total. There are innumerable phases to its value which make the transcontinental road one of the most highly prized assets of each locality.

The Lincoln highway committee of the Oakland chamber of commerce in calling the attention of the people of Oakland to the value of the Lincoln highway to themselves, has made some pertinent statements which apply with equal force all the way across the country. Among other things it is said:

"Over 30,000 tourists in 1915 passed through Oakland by this route.

"They left over \$100,000 in Oakland.

"They took away with them enthusiastic impressions that will give incalculable publicity to Oakland.

"Its impetus to Oakland's prosperity is greater than the entry of a new trunk railroad, or the Panama canal.

"At the eastern end two and a quarter million dollars have been spent; Oakland is cashing dividends on that now."

These facts are being brought home to the people of Oakland through the distribution of a small booklet, entitled "Ten Simple Memory Plasters," which in addition to the above contains the news that Oakland will establish camps and rest stations along her section of the route and that she will sign the highway between the city and Salt Lake, Utah.

Here is a record and an indication of progress deserving the attention of the remaining four hundred cities and towns on the Lincoln highway.

Notices have been sent out to contractors for bids on work in Trimble, Todd, Caldwell, Ballard and Warren counties, in Kentucky, for road work to be done immediately under supervision of the state highway commission. Bids are submitted to Rodman Wiley, state commissioner of public roads, who succeeded Robert C. Terrell on July 1.

# The New Road Partnership

## The Federal Government Joins Hands With the States in the Tremendous Task of Building Better Roads

**T**HERE are many points of difference between the Shackelford Bill, which passed the House by a vote of 281 to 81, and the Bankhead Bill which has passed both Houses and which will doubtless have the approval of the president before this article is published. For example the Shackelford Bill called for an appropriation of \$25,000,000 to aid the states in improving their public roads used in the postal service; the Bankhead Bill appropriates \$75,000,000 for the same purposes and in addition \$10,000,000 "for the survey, construction and maintenance of roads and trails within or only partly within the National forests, when necessary for the use and development of resources upon which communities within and adjacent to the National forests are dependent." The appropriation made for the roads and trails in the National forests will not be available except upon a co-operative agreement made between the State, Territory or county and the Secretary of Agriculture "for the survey, construction and maintenance of such roads or trails upon a basis equitable to both the state, territory, or county and the United States," and provided, further, that "the aggregate expenditures in any State, Territory or county shall not exceed ten per centum of the value, as determined by the Secretary of Agriculture, of the timber and forest resources which are or will be available for income upon the National forest lands within the respective county or counties wherein the roads or trails will be constructed."

The title of the bill has been changed, by agreement between the two Houses, to read: "An act to provide that the United States shall aid the states in the construction of rural post roads, and for other purposes," among the "other purposes" being roads "which may be used in the transportation of interstate commerce" and "military supplies." The act will be operative only under such rules and regulations as the Secretary of Agriculture shall prescribe, in the formulation of which he engaged immediately upon the passage of the measure. The organization of this work imposes an enormous burden upon the Department of Agriculture, involving as it does a practical, not to say an intimate, knowledge of all the varying conditions of the public roads situation throughout this vast country—the differences in local administration, the confusing variety of laws, the difficulties in topography that must be met, the educational lessons that must be impressed upon the people so that they will understand that the United States has entered into a partnership with the states for the benefit of the people, but an equal partnership requiring equal performance of both partners in every case.

### Roads Problem Practical.

The good roads problem is wholly practical; there is no politics or sectionalism or special privilege in it. It was not designed in the interest of any existing or projected highway system—the Secretary of Agriculture, in agreement with the highway department of each State will determine where the roads shall be built and of what material they shall be constructed. Besides being distinctly constructive in character, the Bill is wholly constitutional in form, especial care having been

taken by the Congress to protect the fundamental law from the violation of any of its sacred precepts. The law not only declares the policy of the government that the construction of good roads is a necessary and essential exercise of Federal duty and authority; but defines the conditions under which such duty and authority may be, or shall be exercised, and in what manner Federal aid in road building may be obtained by the states. The law appropriates, "out of any money in the treasury not otherwise appropriated," \$75,000,000 for the construction of rural post roads, of which \$5,000,000 will be available for the fiscal year ending June 30, 1917; \$10,000,000 for 1918; \$15,000,000, for 1919; \$20,000,000 for 1920, and \$25,000,000 for 1921.

The allotments of the Federal fund to the several states will be made by the Secretary of Agriculture in this manner: One-third in the ratio which the area of each state bears to the total area of all the states; one-third in the ratio which the population of each State bears to the total population of all the states, as shown by the latest available Federal census; one-third in the ratio which the mileage of rural delivery routes and star routes in each state bears to the total mileage of rural delivery routes and star routes in all the states, at the close of the next preceding fiscal year, as shown by the certificate of the Postmaster General.

The law provides not only for Federal aid in the construction of rural post roads but also for their repair and maintenance after they have been constructed and that such repair and maintenance shall be a charge upon the States or political divisions in which the roads are constructed; and that no further apportionment of Federal funds shall be made to any state or division in which the repairs and maintenance have not been made to the satisfaction of the Secretary of Agriculture. No public road can be built under the terms of the law until its location, character and cost have been approved by the Secretary. Every road project with the plans, specifications and estimates of cost must be approved by the Secretary before any part of the Federal appropriation can be apportioned to it under the law. The Secretary is forbidden by the law to approve any road project which is not "substantial in character." He cannot make any payment for the construction of any road in excess of \$10,000 the mile. The construction work and labor in each state is to be done in accordance with the laws of the State and under the direct supervision of the State highway department, subject, however, to the inspection and approval of the Secretary of Agriculture without which the State cannot share in the apportionment of the Federal appropriation. The law authorizes the Secretary to expend three per centum of the appropriation for any fiscal year for administration.

No state can have any share in the Federal appropriation which does not agree to the terms of the law. It is a fifty-fifty proposition. The state which puts up a dollar for building a rural post road will get a dollar from the United States, upon compliance with the conditions named in the law. Nothing is taken for granted. It is all written down in the law. There is to be no politics in it, no favoritism, no inter-state or trans-continental or other highway system already projected or dreamed

out by forward-looking men that does not have the backing of the State highway authorities and the necessary approval of the Secretary of Agriculture. It is a sound business problem thought out by the most careful political economists, constitutional lawyers and plain ordinary business men with the single object of providing ample ways for the business of the government and the traffic of the people. Too much cannot be said in appreciation of the faithful and intelligent service of Senator Bankhead of Alabama in pushing this great constructive act to successful completion.

#### Road to Top Mt. Whitney.

A highway to Mt. Whitney, the highest peak in the United States, will be built if plans recommended by the Los Angeles Chamber of Commerce are carried out. The California mountain is 14,502 feet in the clouds, about 400 feet higher than Pike's Peak in Colorado.

The proposed road would open up wonderful scenic territory, as it would pierce the great Sequoia forest reserve for 85 miles. A preliminary estimate places the cost at approximately \$300,000. The several counties and organizations that are pushing the project are hoping for government aid, as the new highway would afford better fire protection for billions of feet of magnificent lumber owned by Uncle Sam.

Surveys indicate that the summit of the towering peak could be reached by a road with a maximum grade of 10 per cent.

The view from the top is pronounced unequalled in the world by those who have made the trip on horses. Death Valley, the Funeral mountains and hundreds of lakes, streams, forests and ranges are visible. While highly desirable from a scenic viewpoint, the proposed highway is important commercially, as it would open miles of hitherto inaccessible reserve now used extensively for cattle.

#### South Logical Auto Section.

California has for a long time led almost every other section of the United States in the purchase of automobiles, per capita.

The reason for this is the magnificent roads, the excellent climate which makes automobiling pleasant the year round, and the ability to buy.

The southern states present a similar condition: There isn't a month in the year when autoing may not pleasantly be done in the south Atlantic states. The roads during the entire year perfect, and the weather ideal.

The automobile industry is just beginning to come into its own in this territory. The joy of living in rural homes, in close touch with towns and cities via the very best highways, is being experienced throughout this entire section, and the next great move in automobile buying is going to be experienced by the manufacturers in the south Atlantic states, ahead of any other section.

The best streets in the principal cities of this section, which were formerly a mile or two long, are being made forty and fifty miles long by the use of the auto, plus first-class thoroughfares.

It is true that at the present time the southern states have fewer autos per capita than the other states of the nation, but this condition will not exist long. The Bankhead good roads bill just recently passed by congress appropriating \$85,000,000 to aid in the construction of good roads, will materially help the south. Georgia alone gets \$2,000,000 of this sum, and the other

southern states in proportion. Many of the southern states, and particularly Georgia, already have excellent roads, better than can be found in any state of the union—with the possible exception of in southern California, and three great trans-continental auto roads are planned to connect the south up with other sections of the country.

The south is the next logical field for the auto manufacturers to invade with their selling campaigns, and of the south Atlanta is the commercial hub—the location of the distributing plants of the most enterprising manufacturers in all lines of goods.

The farmers of the south no longer depend upon cotton as their one crop—they are raising cattle, hogs and foodstuffs, and are more prosperous than ever before in history—and with prosperity comes the necessity for the auto. It is freely predicted that in a few years Georgia and many of the southern states will be rivaling Iowa in the matter of the number of automobiles per capita.

#### The Logic of Good Roads.

The Freeport, Ill., Journal-Standard asks:

"Is there any logical reason why the farmer should use a threshing machine to save time and labor, and then haul his straw and grain to market by old and time consuming methods?"

"A farmer who would refuse to have his oats threshed by machinery would be the laughing stock of the country. Yet it would be as profitable for him to thresh his grain, if he could have it hauled over all weather highways at the moment the price reached its highest point, as to follow his present methods.

"The fact that not every farmer can afford his own threshing outfit does not prevent him from availing himself of the benefits of the improved method. Not every farmer will be able to have his own motor truck to market his produce, when good roads are achieved. Nor will this be necessary. In every city of every size we find motor delivery systems for the use of the smaller merchants. The same system is now bound to follow in the wake of good roads. And the smaller farmer will be enabled to get his produce to the market on schedule time every day in the year and to secure a steady income.

"The means are at hand to pay for the roads. The modern motor car is more than equal to its part of the work. It remains simply for you, Mr. Farmer, to say yes.

"Will you say it?"

#### Texas.

More attention is being given to the construction of good roads in Texas than was ever before known in the state. Besides the work that is in progress in more than one hundred counties, bond issues aggregating more than ten million dollars have been voted recently and are pending. For more than five years the advocates of good roads have conducted a persistent campaign for the issuing of bonds by the counties. This missionary work is now bearing fruit in a way that indicates that Texas is soon to take front rank with other states in modern highways.

All that is needed to round out and make completely effective the good roads campaign is a State Highway Commission, and a law that will bring uniformity to the different road systems. It is expected that this legislation will be obtained when the legislature convenes in January.

# Good Roads and Preparedness

**Address Delivered Before North Carolina Good Roads Convention, by Col. B. A. Stevens, State Commissioner of Public Roads, New Jersey**

**T**HE SUBJECT assigned me is not perhaps as definitely stated as might be desirable. We are probably all pretty well agreed as to the meaning of "Good Roads." The question is whether we all have the same understanding as to the meaning of "Preparedness." I am not in love with this latter word. Its meaning is too indefinite and it has been too much abused in the last few months. Good roads, in the same way as railroads, manufacturing plants, agriculture, and other industries, are all necessary for the development of the greatest national exertion of force, such as would be needed in a struggle for national existence on our own soil. In this sense, "Preparedness" as to "Good Roads" would include the location and design of roads best suited for military purposes. Besides having the right kind of road in the right place we must be able to make the best use of it, if we are to call ourselves "prepared." As to the former, some assumption as to the location of the military operations, the magnitude of the forces involved, and the general plan to be followed would have to be made. As to the latter, it is certain that roads of considerable width and capable of carrying concentrated loads of 16 to 18 tons would be desirable, and this would involve bridges on which two such loads could meet. Both the bridges and pavements necessary for this service are considerably in advance of the usual practice in this country, even in such thickly inhabited states as my own.

This brings me to another meaning of the word "Preparedness" to which I would more specially draw your attention today. Almost all of our states have come to the conclusion that good roads are essential for their proper development. Those few communities which have not reached this conclusion will, within the near future, have a disastrous demonstration of their mistake. In the presence of such an audience as this, I am justified in assuming that good roads pay, that we must have them, and the question is how shall we get them. If we are to have them, we must be ready to build and so maintain them as to receive the benefits due to their construction; in other words, we must be prepared.

## Different Problems Presented.

Your state differs very greatly from mine. Roughly, your area is 52,426 square miles, or 6.3 times the size of New Jersey. Your population in 1910 was 2,206,287, or 87 per cent of that of New Jersey. Your road mileage is about 50,000 or 3.4 times that of New Jersey. Your motor vehicle registration in 1914 was 14,815, or about one-fourth part of that of New Jersey. Your mountains are higher and your extreme of cold probably much the same as in New Jersey, but through a large portion of your state your winter climate is much less severe. The coastal plain and the adjoining Piedmont country conform closely to ours, but we have no such mountainous region as forms the western portion of your state. We produce no cotton, no tobacco, and practically little of the lumber which forms so very large a portion of your output; but we produce and haul vast loads of garden truck and of manufactured products. In other words, New Jersey, under somewhat different climatic and natural conditions, represents the more acute stage of highway development incident to a denser population. To this in time you will

attain. With the great natural resources of North Carolina and with the progressive and energetic spirit which has always characterized its inhabitants, it will not be many years before the traffic of your highways will be fully as important as it has become with us and that you will be called on to meet problems equal in seriousness and difficulty to those which we are now facing.

Our improved road development has been entirely along the lines of state aid extended to local communities. In this exercise of the power of the State the greatest regard was at first paid to local self-government. As the problem increased in size and difficulty it was found necessary for the State to assume more and more control over the local bodies. The immediate result was that the State Road Department became vested with the power of stopping county road improvement by withholding State aid, practically in its discretion. The demand for good roads, however, increased to a greater extent than legislatures were willing to meet in appropriations and it therefore became necessary to allow the counties to build roads entirely on their own means, and this is the position today. The results have been far from satisfactory. It has been very difficult to secure any continued policy of road improvement. This question naturally becomes involved in local campaigns and pledges are made on the "stump" which must be redeemed if possible, often to the detriment of the roads. Some of the counties rushed into construction without adequately providing for financing the first cost and that of maintenance; the patronage of road service was handled in many cases along political lines; the counties have generally shown themselves unable to meet the problem of maintenance in any thorough and satisfactory manner; all of which resulted in much inefficiency and loss. This sequence of events covered about twelve years and coincided with a statewide growth of traffic such as the world has never seen outside of such states as New Jersey, Rhode Island and Massachusetts. This growth has been of the utmost industrial importance. It has changed methods in manufacturing and agriculture and has opened up to settlement large areas heretofore unavailable for the purpose. The older roads were not designed to carry any such loads as these conditions have produced. As a consequence, many of them have deteriorated in condition and repair charges have increased enormously.

## Learn by Means of Failures.

But much more serious than the breakdown of pavements was the fact that this sudden and unforeseen growth of highway business found us unprepared to meet the administrative conditions thereby created in any adequate and scientific way. Engineering has gained in the past more from the lessons taught by failures than by the very few brilliant inventions. The profession has learned and is learning today what it cannot do, and hence, by exclusion, what it is best to do. The same is true of public administration. But to realize the value of failures they must be studied, the conditions under which they have happened must be determined and recorded and the data reduced to workable formulae. It is of little profit to know that a piece

of steel was broken by a load of unknown character and amount, it is of the greatest value to know that it failed in tension at a stress of 60,000 pounds to the square inch. It is likewise of little gain to know that a macadam road has failed under an increasing load unless we know what that load was, what were the character of the base and its drainage, what the condition of the surface and what care and money had been devoted to its maintenance.

None of these facts will be available without a thoroughly organized force able to handle not only the field work but the accounting and statistics needed to record and analyze the experience and without which its priceless instruction will go for but little in planning the work of the future. It is in the failure to provide this force that we in New Jersey have fallen short. In the development of such a transportation system as ours, it is inevitable that some types of design and construction should prove inadequate, but we have failed and are failing to gather therefrom information that will be beyond value in the future.

#### Quality Now First Consideration.

We have not in the past and we are not today planning our work on the thoroughly analyzed experience of the past. In fact we are and necessarily can only plan it from year to year. We are beginning to realize the need of providing for maintenance in the future. From priding ourselves on the low first cost of our roads, we are now trying to see how well, irrespective of cost, not how cheap we can build. This is but a natural reaction. It is all the more natural when we consider the character and makeup of the county governing bodies and their advisers, under whom this work is done. The county boards are elected for short terms. They appoint their engineers and supervisors for five years. This latter term was increased with a marked improvement, but there is constant change in personnel and in policy. The members of the boards are generally not used to handling important administrative problems nor have most of them been trained to work as part of an industrial organization. The same is true, possibly to a less extent, of their engineers and supervisors, and where it is not true it is rarely that they look on the road problem as one to be solved like other important engineering tasks. With such an organization, based on a unit too small to afford the cost of gathering and analyzing data and lacking confidence in itself, the effect of a breakdown is but too apt to be disastrous. What is needed in such trying times is the confidence in the organization and the controlled team work that can be obtained only from men trained to act together, skilled in their work and accustomed to each other. These characteristics can be counted on only from a permanently organized body and not from an agglomeration of temporary or short term appointees no matter how high their personal attainments or how great their devotion to the service. Our failure has not been one of engineering structures, but the breaking down of an organization, or rather of an agglomeration of organizations under a strain they were not able to meet. As a contrast, let me cite an example from the great war. The defense of Verdun offers a good example of "Preparedness" in road administration. As is well known, the French army has been kept supplied by motor truck. The number of men is unknown and so are the weights moved. If, however, the ordnance weights are from six to eight fold the quartermaster and commissary weights, there will be not less than 40 pounds moved per man. The French force cannot be

less than 300,000. This would mean some 6,000 tons a day—or say 2,000 three-ton trucks each way a day—or one each way every 43 seconds. The number of roads used is doubtful. The photographs published and shown as "movies" allow us to judge the type of road. It is evidently a limestone macadam. French limestone is usually soft. Such loads as one-half or one-third of the above will make short work of any macadam surface unless the repair work is prompt and efficient. The drive against Verdun coincided with the most trying season on roads. Yet, if the photographs show the true conditions, the roads are in splendid shape. It seems probable that the motors could not have stood the strain of poor roads. These conditions are not the result of good luck. They are due to well built roads, well maintained. But this has been possible only by the organized effort of trained men and whatever success the French may obtain at Verdun will be due not only to the soldier in the trenches but to the patient, enduring and humble labor of the men who made the supply of the necessities of life and of munitions for the fighters possible by the condition in which they kept the roads. This they were able to do on account of the centuries of training and careful study that the French have given their roads. In a word, they were ready and made good.

I trust that this contrast will impress itself on you. I know that money spent on engineering study, on accounting, on organization, seems like a waste when the people are clamoring for good roads and want them in their business and at once. I know the numerous and exacting calls on public moneys for other purposes. Yet, if you believe as I feel sure that each of you does, that North Carolina is to assume in the not distant future the industrial importance that her soil, her forests, her water power, and above all her energetic, hard working and earnest manhood, place at her command, your roads must fit your coming state. To have such roads you must be ready to meet the problems that go with them. Paraphrasing Davy Crockett, one of our early advocates of "Preparedness," "Be sure you are right, then go ahead."

#### First Road in Tennessee.

That the first road built in Tennessee was surveyed by the United States government and was built by the state is a fact given in a letter from Capt. W. E. McElwee of Rockwood to J. J. Murray, secretary of the Tennessee department of highways. This road was surveyed by direction of President Washington and followed the trail made by the buffalo and traveled by Indians. The road was built by the state of North Carolina, then comprising Tennessee, the money being raised by a lottery authorizing the sale of enough tickets to finance building the road, land in the new territory being given as the prizes.

Portions of this first road are still in existence, and have been designated as the "Bristol-to-Memphis" highway. Establishment of this road was authorized in 1787, and when the money was secured Major George Walton was sent from North Carolina with a company of soldiers to build the road. Thus the first road west of the Appalachian mountains was surveyed by the government, built with state aid, and soldiers used to protect the builders and force the right of way.

Another significant fact given by Captain McElwee

279 miles out of a total of 508 of highways in Pulaski county, Ark., are now listed as improved roads.

# Construction and Maintenance of Macadam Roads

By W. W. CROSBY

Consulting Engineer, Baltimore

SOME DIFFERENCE of opinion seems still to exist unfortunately as regards what is meant by the term "macadam," but without going deeply into the discussion on this point and mainly for the purpose of making clear and without indefiniteness the statements which follow, it will be assumed that by "macadam" is meant a roadway surfacing or road crust composed of more or less angular particles of broken stone, slag, shells or gravel, free from extraneous matter, somewhat, at least, graded as to sizes, spread above a prepared and compact sub-grade or foundation, compacted to at least a reasonable degree and then the interstices of the mass finally filled with fine material with the aid of rolling and of watering without the use of fine material in excess. A mass of stone or other material without mechanical bond between its angular particles and with such an excess of fine material that the stones are merely bedded in the latter like plums in a pudding, such as may frequently be found to be the case on some solid turnpike where the roughly broken stone are covered with earth from the road side and the whole mass allowed to pack down under traffic, is not to be considered "macadam."

It has been said that "the macadam road is dead", but the speaker must strongly disagree with this idea. On the contrary, he thinks that the usefulness of the macadam road when properly built and properly maintained, is just beginning to be appreciated. Further, the construction of a good waterbound macadam road comprehends so many principles applying in all highway construction that the importance of a thorough understanding of how properly to construct a macadam road and then how to maintain it cannot be over-estimated. If these principles shall be thoroughly understood, then the grasp of allied principles, affecting the construction of other road crusts and pavements, will be clearer and firmer.

## Construction.

Confining ourselves not to macadam road but remembering and regarding the wider application of the principles involved, we should regard the macadam road crust as merely a roof over the foundation to keep the latter in proper condition to support the strains coming on it and to protect the foundation from wear which it is not designed to withstand. In other words, the foundation must ultimately carry the load and the macadam can at most simply distribute the load coming on the surface of the latter over a somewhat greater area of the foundation. It is useless to attempt to build a macadam road crust until the foundation shall have been put in such condition that it will support loaded in the foundation; that loose and too readily distortion, the load coming on it. This means that wet sub-grades with weak supporting power must be stiffened and strengthened by being drained of the excess water; that matters subject to decay must not be allowed in the foundation; that loose and too readily displaced material in the foundation must be removed and made more compact and stable by some means or other; and that, in fact, every precaution must be observed

before beginning the construction of the macadam to place the foundation or sub-grade in suitable condition. Generally speaking, it is not wise to rely too much on the power of the macadam layer to distribute over a larger area of sub-grade the strain per square inch coming on the surface of the macadam. On the other hand, this may be done successfully to a certain extent, and a 4 inch macadam may very properly be built on some stretches of naturally excellent sub-grade, a 6 inch macadam be required for ordinary sub-grades, and an 8 inch or even 10 inch macadam provided for weaker sub-grades under extreme conditions of traffic. In even other cases, the interposition of a layer of material, such, for instance, as a layer of stone screenings, sand, or sandy gravel, that will further distribute the strains or assist in preventing the displacement under traffic of unstable material forming the sub-grade, may be warranted.

The decision on this point will be made on the peculiar conditions of the case, but as this matter may properly be said to concern more the foundation than the macadam, and as the subject assigned the speaker is the latter, with a limited time for its consideration, further discussion on foundation questions will be omitted, except that the speaker will again repeat his warning to the effect that it is useless to attempt the construction of a macadam road crust, or for that matter, any other crust or pavement, until the foundation shall first have been properly prepared.

Coming now to the macadam itself, and because of the far greater use of broken stone for this road crust, let us consider mainly a broken stone macadam of the ordinary thickness of 6 inch after completion. MacAdam himself, knowing nothing of rock crushers or steam rollers, advocated stone, broken by hand to a maximum size of about an inch cube, being spread on the roadway and allowed to compact under traffic without the addition of any fine material. He said he wanted angular fragments of stone that would enable an interlocking to take place among themselves without the interference which the presence of fine material would afford. He figured that this would be brought about were his rules followed and that such fine material as would be necessary to fill the otherwise irreducible voids in the mass would be produced under traffic. He claimed that it was necessary to avoid having stone above a maximum size (which he set as the inch cube) in order to insure the stability of the larger pieces as traffic came on them, and to prevent a rocking of the stone and the subsequent loosening of the whole mass which would inevitably occur if any particles were too large to be properly bedded. MacAdam used gravel as well as broken stone and claimed his principles applied to the varying sized gravel stones in the same way that they applied to the perhaps more uniform sized but angular pieces of broken stone. There seems to be no reason why they should not apply equally well to broken slag, unknown in MacAdam's time, and even to oyster shells.

With the development of the stone crusher and the

steam roller, certain changes in practice took place, but in the main, the principles of MacAdam have been unaltered.

### Filling Top Surface.

\*\*\*After the macadam shall have been spread and compacted it becomes necessary in any case to fill the interstices unavoidably remaining in the upper part of the crust with fine material so as to secure the impervious roof desired for the foundation, and to lock finally or to fix in place, so that they will not become dislodged under traffic, the coarser particles in the wearing surface. While in MacAdam's time, steam rollers were not available and it is probable that this final binding was produced through the action of traffic on the road, unquestionably some damage was incidentally done to the macadam by this crude process and not as strong a macadam was secured as is practicable under proper steam rolling. For instance, the angularity of the particles aiding in their interlocking was undoubtedly lost to some extent. Under the roller, it is possible to make a considerable reduction in the voids of the mass with no appreciable loss of angularity of the particles. It is, however, true that if the rolling is continued beyond a certain point, at which point the compaction of the mass is probably near the maximum, this loss of angularity does occur, the stones become round, and the results begin to be inferior. It is desirable with the roller to secure the greatest possible compaction but to avoid destroying the angles of the stone, or crushing the latter into small pieces.

When the rolling of the freshly spread stone is first begun, considerable horizontal movement of the stone will be observed. It gradually decreases under continued rolling until only a slight wave in the layer of stone is noticeable ahead of the rolling. With clean stone containing practically no fine particles, no amount of rolling will prevent some motion taking place in the layer of the stone adjacent to the roller as it moves along. Beyond a certain amount of rolling, this movement will increase rather than decrease and the rolling should be stopped as early as possible at the time when the movement is the minimum. An old rule to determine this is for the engineer to walk or press heavily with his foot on the stone in the track of the roller behind it. The particles of stone directly under his foot will probably be movable but there should be no movement in the stones outside the outlines of his foot.

If the surface now shall be satisfactory as to grades and cross sections, which fact must be determined and any corrections made now and not later if they are to be successful, the binding of the macadam may be begun. This is best accomplished by spreading a thin layer of fine material from the stone crusher over the surface of the rolled wearing course, and then applying, by means of a sprinkling cart, a generous amount of water. The water should be applied evenly without sufficient force to wash the fine material laterally, and in sufficient quantity not only to thoroughly saturate it, but to carry some of it at least down into the mass of rolled stone. Great care should be taken in spreading the fine material to make an application even in thickness over the macadam and not to have this thickness too great the first time. If it should be, the water will not penetrate it and carry the necessary fines down into the macadam, but will wash it off at the sides, or form a paste on top of the macadam which will prevent the proper subsequent filling in of the voids in the macadam. Again, it is far easier to remedy the

defect of too thin a first application of screenings by applying more subsequently, than it is to remedy the fault of too thick an application the first time by the subsequent removal of part of it.

After the screenings have been spread and watered for a reasonable stretch on which the roller can readily operate, it will then be necessary to re-water and roll them. The second watering and rolling should be done simultaneously, preferably with the water-sprinkler travelling just ahead of the roller and throwing its spray a few inches in advance, and to some extent on the front wheel of the roller. A generous quantity of water must be used at this time in order to prevent the watered screenings sticking to the roll of the roller, and also to enable the roller to puddle the screenings down into the macadam. The process must be continued until a muddy wave is pushed along the surface of the macadam just ahead of the front wheel of the roller, though it may be necessary with some sub-grades especially susceptible to the softening influence of water, to reach this point by stages, and not to attempt to reach it in one operation. To reach it by stages will give the opportunity for the sub-grade to recover from the softening influence of the water reaching it through the imperfectly filled macadam.

When the macadam shall have been grouted as above described, it should be permitted to dry out and preferably should be opened to traffic during this drying out period. It is impossible to consolidate waterbound macadam with a steam roller so that it will not loosen up to some extent on its surface when traffic first comes on it thereafter, and this loosening may result in considerable deterioration of the macadam if it is not promptly corrected. By admitting traffic to the roadway while the roller and water cart are in the vicinity, any such loosening may be readily corrected by re-watering and re-rolling. In this way a much stronger and more lasting macadam may be secured with little if any additional expense.

When the macadam shall have been finally finished in accordance with the above, a thin uniform layer of screenings should be spread over its surface just sufficient in thickness to hide from view the coarser particles composing the wearing course. This layer will serve to protect the macadam during its final drying out and will also furnish any further fine material needed to fill the voids which will occur to some extent from this drying out process, or any other voids which for any reason may develop.\*\*\*

### Maintenance.

The details of the maintenance of macadam roads embrace the upkeep of the shoulders as well as the upkeep of the macadam roadway itself. The shoulders have to be preserved in good condition not only to provide the additional width more or less occasionally necessary for the traffic, for appearances and for general satisfaction, but they also have to be preserved in good condition in order to afford the proper protection to the macadam. If washouts are allowed to occur in the shoulders, the edges of the macadam may be endangered and inroads into the macadam may begin and grow rapidly. If material is allowed to accumulate on the shoulders, the drainage across the latter may be interfered with and washouts in the macadam developed. If ruts or depressions that will hold water occur in the shoulders immediately adjacent to the macadam, the foundation of the latter may be weakened and the macadam damaged or destroyed.

One of the most effective tools for keeping the shoul-

ders in good condition is the log drag, and it should be generously employed in all cases where the growth of grass or the presence of stone does not render it useless.

The growth of grass within the limits of the shoulders is to be encouraged as it aids in the preservation of the shoulders, the resistance of the latter to washing effects of water and to the general appearance of the roadway. The removal of sod from the shoulders is almost always a mistake. The grass should be kept sufficiently mowed to prevent obstructions to drainage. Should the sod develop to such an extent as to interfere too much with the drainage, it should be lowered by the removal of material from underneath it so as to provide frequent flat shallow channels for carrying off the water or generally over as large areas as may be necessary, replacing the sod itself when the sub-material shall have been taken out.

The upkeep of the macadam itself may be performed in various ways according to necessities of the particular case. With waterbound macadam, perhaps the first thing to be done is to repair little depressions that occur in the surface by reason of the giving way of the macadam in small areas. This giving way comes from a sinking of the foundation from one cause or another directly under the spot itself, or from a disintegration under traffic of the material in the macadam. Such areas, unless promptly repaired, rapidly get worse and extend. If taken early enough, their repair can be effected by simply spreading a little clean material loosely in the depression and trusting to the traffic to consolidate it. If, however, the affected area is of considerable size, it may be necessary to loosen up the old surface with a pick so as to facilitate the binding of the new material into the old. Ordinarily no fine material should be used in the above process, contrary to what frequently seems to be the opinion and practice. The necessary fine material will be furnished under the traffic and if any fine material is supplied in the first place, the results will not be lasting and will be unsatisfactory.

#### Watch Motor Traffic.

Perhaps the next attention frequently needed by waterbound macadam is that of providing sufficient fine material on the surface to replace that swept from it by the wind or by motor traffic and to prevent the loosening or ravelling of the wearing course of the macadam. Waterbound macadam that has stood for years satisfactorily under horse-drawn traffic, when subjected to considerable motor traffic, shows a tendency to become bare and rather quickly afterward to get loose and to ravel badly. The horse-drawn traffic supplied sufficient fine material to prevent this condition occurring, but the motor traffic sweeps the fine material from the surface and often from between the stones of the macadam itself, bringing about the loosening of these stones under traffic.

If the motor traffic is not too severe, the ravelling can be prevented quite satisfactorily by occasionally spreading a thin layer of fine material over the surface of the roadway. The main objections to this procedure is that in dry weather, the road becomes somewhat dusty, but this may not be as serious an objection as the higher cost of some other means for accomplishing the results desired. In selecting material for this purpose, care should be had to use the best sand obtainable, and this sand should be as nearly as practicable of the same quality as would be used for mor-

tar or concrete. Loam or silt should not be used and often loamy sand should be avoided if practicable. Screenings from a crusher may be used but are not, unless the rock being crushed is unusually hard, generally as desirable as good sand.

Watering the macadam will to some extent prevent its being swept bare and will assist in preventing its ravelling. Generally, however, it is difficult to insure its being watered just when it is needed, and the watering process is usually more expensive than the sanding. Watering of course does not produce dust, but it does to some extent produce a muddy condition which is sometimes found objectionable.

Oiling waterbound macadam is done to accomplish the ends above mentioned with a still further reduction of the objections mentioned, such as dustiness, muddiness and expense. Oiling of course does prevent dustiness, and, properly done, results in not objectionable muddiness. As to whether the expense is ultimately reduced from what it would be through the use of the sanding or watering processes depends upon local conditions such as frequency of sanding or sprinkling required under traffic and climatic conditions and cost of materials and repair. Properly done, oiling is very effective in preventing the ravelling of macadam and enabling it to sustain satisfactorily traffic up to a certain maximum. Beyond that, oiling will not answer. It should be understood that the oiling referred to is simply the application of a relatively light bituminous material to the surface of the macadam without covering the latter so as to make the mosaic invisible, or without building up a carpet or mat on top of the macadam.

The construction, either at once or by consecutive applications, of a carpet or mat on top of the macadam should be referred to as carpeting. In this work, a somewhat heavier bituminous material should be used be used and one which will have the property of rapidly setting up or stiffening so as to be sufficiently adhesive and cohesive, when pea gravel or stone chips are incorporated with the bituminous material, as to retain its position and integrity on top of the macadam under traffic. Such a carpet properly made and applied acts like a linoleum or a rug on top of a floor. It takes the traffic, prevents any wear coming on the macadam, or any damage to the latter, and needs only to be kept in good condition to permit the macadam to last indefinitely. A bituminous carpet of this sort will sustain a considerable amount of traffic if properly designed and built for it, though there are limits to the amount of traffic of various kinds which any bituminous carpet can successfully stand. When the traffic reaches these limits, the maintenance of the macadam by carpeting should be abandoned and other steps taken, such as the substitution of bituminous macadam or bituminous concrete for the waterbound macadam, if the roadway is to be economically maintained.

Ordinarily the attempt should not be made to build or maintain a carpet on top of the macadam with a thickness of more than 3-8 inch, unless a sheet asphalt mixture is to be considered as a carpet and such a carpet properly designed and applied.

Some interesting conclusions regarding the maintenance of waterbound macadam roadways have been published by the speaker and may be found in the proceedings of the American Society of Civil Engineers for September, 1913, page 1705, et. seq.

# The Various Roadway Surfacing

## Location and Character of Available Materials and Character of Traffic and Grades Deciding Factors

THE following most excellent article on Road Surfacing is of too much merit to allow to go by the board. Through some inadvertence the name of the author is not available. If the author or someone else who knows who collected the data and explanations will furnish Good Roads with same, we will be only too glad to give proper credit in a later issue. The article, which will be of interest to everyone dealing with problems of construction follows:

It is estimated that the United States has 2,300,000 miles of public wagon roads about 10% of which, roughly speaking, may said to be improved. Only about 1 1-3% however, of this mileage, has been substantially improved with state assistance.

A good roadway must be hard, smooth, fairly free from dust or mud and present a reasonable minimum of resistance to the traffic which it bears, considering the kind of materials used in its construction. In general a road must be satisfactory to its users before it can be classed as a good road.

The materials available for road surfacing are:

1. Common earth, sand and clay, suitably combined or treated with some other materials.
2. Gravel.
3. Crushed rock or other substitutes for macadam, such as slag from charcoal iron or blast furnaces, the latter being much preferable.
4. Such combinations of numbers 2 and 3 as may be found advisable, a gravel base with a macadam top or a macadam base and a gravel top.
5. Bituminous macadam (penetration method.)
6. Cement concrete, using gravel crushed rock or slag for the coarse aggregate.
7. Bituminous concrete (the mixing method) by using the materials above named for the aggregate and refined tars or asphalts for the binder.
8. Brick with foundations of concrete, water bonded macadam gravel or sand.

Which of the above materials should be used for a given road is a problem for the road engineer to solve, and it is usually capable of an economic solution leaving the answer beyond reasonable doubt. However, in many cases available funds limits the choice of materials to those close at hand and cheapest in first cost regardless of whether they are really the most economical, considering the perpetual upkeep of the road, or not. But often the materials have to be freighted from a distance, and when the community is rich enough to build the most serviceable road, the skilled road engineer can demonstrate his usefulness, providing he has persuasive powers enough to overcome local prejudice for or against particular materials and the arguments of men who may wish to sell these or other materials regardless of their fitness for the road in question.

The writer has long preached the doctrine that there is no one best material for road surfacing in all places and under all conditions of soil and traffic, and that almost every available road material can be used to advantage some where in such a comprehensive system of roads as is required to serve a state.

The accompanying table shows the mileage of state aid roads of different classes in twenty-five states and the percentage of each class now in use.

1. Sand-clay and top-soil roads comprise about one-sixth of the mileage given (16.4%) showing that these

roads are of considerable importance. They are well adapted to a medium horsedrawn traffic with a somewhat larger percentage of automobiles and can be economically maintained by systematic use of the road drag after rains and the addition of such new material sand or clay, as may be required.

Kansas reports 758 miles of these roads; Louisiana 423 miles and Connecticut 318 miles, showing that they are by no means confined to the southern states as is frequently supposed, although so far as I know, the top-soil roads are mostly found in that section.

2. It will be noted that gravel is the favorite road building material in most of the states, comprising more than two-fifths of the entire road mileage reported, (41.2%). Washington reports 3,900 miles of these roads, Michigan 2,061 miles, Utah 1,319 miles and Vermont 1,053 miles, while three other states report over 400 miles each.

### The Gravel Roads.

No doubt gravel is used on many roads because it is within a wagon haul of the road and cheap. However, taking Michigan as a fair example, where upwards of 60% of the state aided roads are built of gravel, I am quite sure that in the majority of cases the travel is not so heavy that an economic mistake has been made by using gravel for road surfacing. In other words when we take into account first cost, plus maintenance, plus repairs, plus interest on the investment, we will have a smaller total than with most of the expensive types of roads.

On the other hand the writer has in mind several instances where gravel roads have been built on which the traffic, mostly automobiles at high speed, is so heavy that nothing poorer than cement concrete, asphaltic concrete or brick can be expected to last very long, nor be kept in a reasonably passable condition by constant maintenance. Such roads, however, are carrying a traffic of from 300 to 500 and more vehicles daily, about three-fourths of which is motor driven and constitute but a very small percentage of the gravel road mileage of Michigan, hence they may be considered the exceptions which prove rather than disprove the rule.

The writer knows of many gravel roads where the traffic is between 200 and 300 vehicles daily with the same percentage of automobiles as above noted that are standing up admirably and are being maintained at a cost far below the interest on the difference between the cost of these gravel roads and almost any type of more permanent road which might be mentioned.

In Michigan the average cost of the single track gravel road is about \$2000 a mile, the same width of water bound macadam \$4500 per mile, while cement concrete roads of the same width cost about \$7000 a mile. In the majority of cases the concrete roads are from twelve to sixteen feet wide and cost from \$14000 to \$17000 a mile, or about \$1.25 per square yard, plus the grading and drainage structures.

From the foregoing it will be seen that the annual cost of maintenance on a gravel road will have to approach about \$250.00 a mile a year before any community can afford to consider any type of road costing \$7,000.00 a mile or more so long as the gravel road

surface is satisfactory to the public, and in many places it is the most satisfactory type of road built.

#### Water Bound Macadam.

3. The water bound macadam road represents more than one-fifth of the mileage given (22.9%) notwithstanding the fact that many people are predicting that this type of road is of but little use under modern traffic conditions.

It will be seen that the sand-clay and the water bound macadam mileage together are about equal to the total gravel road mileage.

Michigan reports 829 miles, Virginia 876 miles, Ohio 786 miles and Connecticut 527 miles, showing that the water bound macadam is well distributed and by no means obsolete.

While the surface treatment of these roads is the subject of another paper, the writer still believes that proper bituminous treatment of the water bound macadam road after it has been in service six months or one year will enable it to resist automobile traffic sufficiently well to give it a high place among the desirable roads under present traffic conditions.

4. Owing to the fact that the gravel road service is preferable to that of many other types, many roads are now built having a base of crushed stone, slag or other suitable material with a top surfacing of gravel. Upwards of 6% of all of the roads reported are of this type, New Hampshire taking the lead with 742 miles while Massachusetts reports 411 miles, Utah 226 and Michigan 134 miles.

The macadam base gives extra supporting qualities for this road while the gravel surface affords easy maintenance by frequent use of the road drag after rains, with only the addition of enough new gravel to keep the surface free from ruts and holes. Macomb county, Michigan, has a road of this type which is well kept, and after two years the total repairs on two miles of road is reported, at only \$315.53, or an average of \$78.88 a mile a year, the larger part of which was spent in dragging. The travel on this road ranges between 200 and 500 vehicles per day.

A few states are building a combination road, using a gravel base and a macadam top, but this type of road is not to be recommended where the automobile traffic is heavy unless some bituminous surface treatment is provided.

5. Owing to the rapid disintegration of the water bound macadam road under excessive automobile traffic, many forms of bituminous binders have been tried to overcome this difficulty. A bituminous macadam built by the penetration process is usually resorted to. This method of construction is well understood by road engineers. The bottom layer of the road is generally built as an ordinary water bonded macadam filled with stone screenings and rolled. The top layer, which may consist of stone ranging from 1 to 2 inches in size, is then applied and given a light coating of clean one-half inch stone chips, free from dust, which are rolled into the surface. After this the road is coated with some heavy bituminous material (asphalt or refined tar) applied hot, preferably by means of a pressure distributor, using approximately  $1\frac{1}{2}$  gallons of bitumen to the square yard. Another coating of clean stone chips is then applied and the road again rolled. This is followed by seal or flush coat of hot bitumen at the rate of about one-half gallon per square yard after which another coat of stone screenings ranging from one-half inch chips down to dust is applied to fill the remaining voids and take up the surplus bitumen. The road may be opened to traffic as soon after completion as the bitumen has set.

These roads constitute 2.7% of the entire mileage reported. New York is credited with 233 miles of this road, Massachusetts with 181 miles, and Ohio with 151 miles.

6. Owing to the reported high cost of maintenance of most of the cheaper forms of road, many communities have been seeking a type of road on which the maintenance would be very small. To many people cement concrete seems to offer the solution and 1.95% of the roads reported are of this type. Ohio reports 66.3 miles completed and 187.2 miles under contract. Michigan has 94 miles completed for state reward, with a considerable extra mileage through villages, on which no state aid was received, and has some thirty miles under construction which will be completed this season.

While the cost of these roads as above noted, has reached from \$7,000.00 to about \$17,000.00 a mile according to width, the maintenance thus far reported has been very small, and the writer is quite well convinced that where the traffic runs above 500 vehicles a day, this type of road is well worth considering. Experience in Michigan with upwards of 100 miles of these roads is on the whole gratifying.

7. Since the bituminous macadam by the penetration method so frequently becomes disintegrated the method of thoroughly incorporating the crushed stone with the bituminous materials in a specially designed mixer is becoming more and more common. Materials prepared in this way are designated as bituminous concrete to distinguish them from the bituminous concrete to distinguish them from the bituminous macadam made by the penetration method.

\* California later reported 800 miles of cement concrete roads covered with bituminous top.

The foundation may be cement concrete or water bonded macadam on which the bituminous mixture is spread and thoroughly rolled, after which it is treated to a surface or squeegee coat of bituminous materials, then covered with stone chips and re-rolled. The road can usually be opened to traffic the second day after completion.

The advantage of this method over the penetration process is the thorough coating of all of the stones with the bituminous binder which is seldom or never done by the other method, thus greatly increasing the strength of the bond.

Less than 1% of the roads reporting are of this type. New Jersey reports  $41\frac{1}{2}$  miles and Connecticut 23 miles.

8. Brick as a paving material for city and town streets has been used in this country for upwards of forty years, but except in a few cases it has not been extensively used in road construction until within the last fifteen years. Ohio reports 444 miles of brick paved roadway, New York 28 miles, Illinois 25 and Minnesota 21 miles. No other state has reported more than four miles of brick roadway. The total is about 2% of all roads reported.

As already stated the writer does not believe that there is any one road surfacing that will best meet all conditions and in this brief paper he has simply tried to point out some of the more important materials now in use, the extent to which they are employed and some of the conditions to which they are adapted.

Every road is a local problem to be solved on the ground after all the data regarding soil, climatic and traffic conditions have been ascertained, all of which must frequently be subordinated to the ability of a given community to pay for any kind of an improved road.

# System Applied to Street Management

By Mr. WILL P. BLAIR

Secretary National Paving Brick Manufacturers' Association  
Cleveland, Ohio

STATE highway departments, collegiate institutions, and even the Office of Public Roads of the United States, have deemed it advisable to construct various types of roads, and roads of like type, of somewhat different construction, with a view of study, recording data, watching behavior, keeping a correct cost, maintenance and repair charge, comparing wear and tear in an endeavor to reach some conclusion and gather some testimony as to the worth and value of such roads respectively. This endeavor on the part of these organizations is perhaps an effort as nearly practical as possible under existing circumstances. Still, in every effort of this sort one's conclusions are drawn but from one character of travel. It is necessarily alike over the various sections. No law of averages can be applied and the best results reached after years of study are of doubtful character. The conclusions are reached from conditions that are widely different from those actually existing on our streets as a whole, no one of which bears the same travel. The effort itself largely artificial, does suggest, however, that no actual condition has been put to any practical purpose from which correct conclusions might be reached. And it does strongly suggest that the information sought is of great necessity.

Why cannot information of this character be obtained in a more practical and scientific manner and the information itself afford greater reliability and more adequately meet the necessities of the case.

There is no plan of street and road management of street administration that can be called fundamentally efficient for the reason that no plan management exists that includes in the construction, maintenance and repair, the availability of the information sought by the building of these so called experimental roads.

Streets which are improved are of various types.

They are in various states of repair.

They are of various locations.

Even a single street receives a variety of travel.

Single streets are often of such location that sections receive more or less travel.

The streets overlie varied conditions of soil.

Some streets are susceptible of easy natural drainage.

Other streets must receive artificial drainage.

## Reason Should Dictate Choice.

The choice, the character, the type, the cost of all, are subject to a greater or less extent to the whim, the notice, to the cheapness of cost, influence of zealous promoters, sometimes secured by one neighbor selling out another—in almost every case chosen from any consideration other than the ones upon which good sound judgment should be exercised—these streets representing one great mass of unknown conditions, evidence simply a lavish expenditure of money known to us as the streets of this city or that roads of this county or that.

But few of these streets and roads have a legal name, most of them bear merely a nick name. None of them bear any identification whatever or relationship to commercial accounting such as is found in every well

regulated commercial establishment. The original investment as to its parts or its whole is not of record—is not charged; cost of up-keep is so confused with general charges against the whole lot that no knowledge whatever is obtainable as to the amount expended on any street or road, and we do not even know the actual reason for the expenditure, whether it was on account of repair due to wear and tear, on account of some defect of original construction, on account of accident, on account of some cut and opening, nor does any record disclose whether the street or road has remained out of repair or whether repair was needed, or whether the street or road has cost in repair an amount exceeding any justification for maintaining a road wholly inadequate for the travel and traffic that passes over it.

This chaotic and inexcusable street and road mismanagement has been allowed existence because streets and roads are sustained by donation in some one form or another, their earning capacity is not held to account. In a commercial establishment, if a like manner and method of conducting was permitted, the institution would soon fall into bankruptcy. A department, a machine under such loose methods would continue in operation at a loss and escape detection. No information as to the value, the worth and economy of any tool or apparatus would be possible upon which improvements could be suggested and undertaken.

What business plan is there, therefore, of street and road management that could be put into operation which would serve immediate and emergency needs equal to any plan now in existence, and at the same time furnish such accurate information as to original cost, cost of operation and service, usually designated as maintenance and repair, the application of such supervisory oversight as that when a break occurs it could at once be determined whether or not it was due to wear or tear or an original defect in some part. Dealing systematically with cuts and openings and replacements to effectually regulate to the greatest advantage of the street, that annoying privilege.

## Keep an Exact Record.

Separate these streets in certain divisions and these divisions into sections, of in no case exceeding one mile in length. These sections must be measured, numbered and recorded for the purpose of complete identification. To illustrate: East 45th Street, division Number 9, Section 17, beginning at the north property line of Superior and ending with the south property line of St. Clair, including inter-sections therein, 4800 feet in length.

You can then treat that particular section of street as a thing, a piece, as a machine from which you can extract information of every kind and character. Similar information can be gathered in like manner from every street within the corporate limits of the city. With the information in hand, which is possible to gather under such a plan, the adaptation of streets of type and kind for the varied services, in a short time will become apparent not only to the student applying

a refined study to the situation, but to the layman as well.

Every county should be required by law to establish a complete identification of roads within the county by section number, of lengths not exceeding two miles, and location by township, and such identification should be made of record and in all cases of contract, maintenance and repair, expenditure therefor should be made and charged as against the particular section upon which the expenditure was made. By such a plan of road and street management, the greatest possible economy would at once become apparent by the ability to trace the actual dollar to the thing purchased for the particular road. Aside from this benefit, data, experience and comparison would become available for future judgment. Street and road improvements, maintenance and repair would at once become a scientific, systematic, business like operation and wasted millions would be saved.

### TEACHING ROADS IN SCHOOLS.

IT IS an old story about the tenderfoot who went from Atlanta down to Augusta with the intention of making his home there and was drawn into a little game of draw poker with sundry citizens of apparently innocent ways and found himself about the time the church bells began to ring in the morning shy to the full amount of his wad. He had enjoyed the evening very much, of course, but when he was invited the next day to "sit in" declined with much feeling on the ground that he would "never play poker again in a town where they teach it in the public schools."

The only thing this well-authenticated story has to do with the subject of good roads is to note the very evident advantage of thorough training even in the least important occupations and the most gratifying educational zeal with which the cause of good roads is being pressed throughout the country. In all the larger and better colleges and universities special courses have been provided for years in economic work and in many of the first-rate schools instruction has been given in domestic studies, or in what used to be called "the science of things familiar;" but it has not been until recently that good roads have been recognized as a subject of sufficient economic importance to warrant inclusions among the specialties of college training. So important, indeed, has the subject become that special courses in road work have been established in eighty-three of the universities and colleges of the country. This may be regarded as a new feature in practical education upon a subject of the most intimate relation to the affairs of the people. The pioneers in this educational work were the "good roads trains" which were sent through the South by the railroads ten or fifteen years ago with government experts to "demonstrate" the economic value of good roads by building specimen sections by approved methods, of substantial materials, so that the people might see with their own eyes what good roads really mean in immediate and direct benefits to them in the conduct of their business and the prosperity of their communities. From the "demonstration" trains the gospel of good roads spread among the people until it has reached the schools, the colleges and universities; and no institution is now giving the best service which does not provide for special instructions in the science of good roads.

A good roads school was held at Purdue University, Indiana, in January under the direction of the School of Civil Engineering of that institution. The University of North Carolina have a good roads institute in the

month of February, Cornell University devoted a week to good roads instruction in February. The University of Tennessee at Knoxville has provided for a short course in highway engineering. The University of Illinois has established a similar course. The University of Michigan has done likewise. The University of West Virginia has just completed its third annual session in the School of Good Roads. A post graduate course in good roads is now being given at the Iowa State College. A special course, under the direction of the Highway Department of the College of Civil Engineering for the education of county road officials, was given in February at the State University of Kentucky at Lexington. Illustrated lectures on highway construction have been one of the special features of the work at Columbia University, last month and this. A special course in road building and maintenance has recently been concluded at the Maryland Agricultural College, and everywhere the educational forces of the country are realizing that no instruction in Civil Engineering is complete that does not cover the vital subject.

### What is Being Taught.

The course in highway engineering provided at the University of Illinois will give some idea of the practical importance of the work. Two weeks were devoted to the subject under the direction of the College of Engineering and these two weeks were filled with demonstrations covering such special topics as surveys, methods of construction and maintenance of earth, gravel, macadam, bituminous and concrete roads, surveys and economics of bridge construction and designs, estimates of cost of concrete culverts, and, indeed, ev-

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ery feature of road work. In this course lectures were given by experts of the highest reputation and practical experience on such topics as road management, road maintenance, road construction, choice of type and principles of design, highways and waterway machinery for road building, roads and rural credit, the effects of good and bad roads on rural community life, the relation of county superintendents to township commissioners, the financial of road improvements, and in this school, as in all the other schools of the same sort, the teachers and the taught were brought into the closest touch so that out of the teaching the whole community would be instructed in the science of doing the thing in which more people are directly interested than any other matter engaging the attention of the educational world.

The United States Office of Public Roads and Rural Engineering has always taken an active part in the good roads movement; in fact, it was the pioneer in this work as in the demonstration trains of the railroads in the South it played a leading part. The American Highway Association and other good road organizations have been doing their part and now that the colleges and universities have made good roads one of the important courses in their instruction the hope and expectation is that the enthusiasm will spread to all men who are interested in the welfare of the people. That the subject has attracted the attention of the lawmakers is evidenced by the increasing number of bills offered in Congress at the last session and at the current session providing for federal participation in the building of good roads. Many of these measures have been impractical; but out of the abundance of suggestions there will be evolved a plan that will assure the construction of systems of good roads that will promote the public welfare.

## GOOD ROADS NOTES IN BRIEF

Anson county, North Carolina, reports that 21 bridges were lost on account of the creeks and rivers becoming flooded during the July rains. Anson is on the South Carolina line, and did not suffer so severely as the counties in and adjacent to the mountains.

The state of Alabama suffered losses to bridges and roads that mounts well up into the hundreds of thousands during the high waters incident to the tropical storm, which hung over that state for about a week during the middle of July. Bridges were washed away by the scores and the roads were flooded and washed in the lowlands.

Contract will be let at Birmingham, Ala., on August 14th for a road leading from that city along the Warrior river to Nichol's Fish Trap, a distance of 14 miles. It will be of a permanent type of construction.

Upshur county, Texas, recently voted \$100,000 in good roads bonds and the Mt. Vernon district, nearby, has voted \$75,000. Both sections are on the Jefferson Highway. Texas expects to complete her part of this road earlier than any other state. Very few sections are now not already built or provided for.

Before Spotsylvania county, Virginia, built good roads the railroads were hauling away 49,000 tons of agricultural products yearly. Since then the yearly average has been 71,000 tons of products hauled over the highways.

Taylor district, Scott county, Kentucky, recently voted an \$80,000 bond issue. Fulkerson district voted

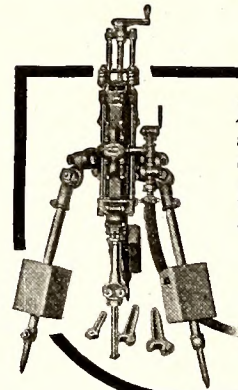
\$6,000 to complete the Boone Highway and Johnson district voted \$13,000 to extend road work begun.

The Nansemond county, Va., road commission at its July meeting decided to build several short stretches of road near Portsmouth, and to take steps toward preserving bridges and securing better highway drainage.

Tazewell county, Ill., has called an election for a million dollars in road bonds. If these carry supplementary funds will be secured from the state. The state is expected to maintain the roads built.

The highway between Jacksonville and St. Augustine, Fla., will be rebuilt. It will be a shell road and will require about two months for the convicts to finish the work.

Oklahoma is in the midst of agitation for the working of state convicts on the roads. They want a law like that in Colorado, which has resulted in the building of 1,250 miles of roads.



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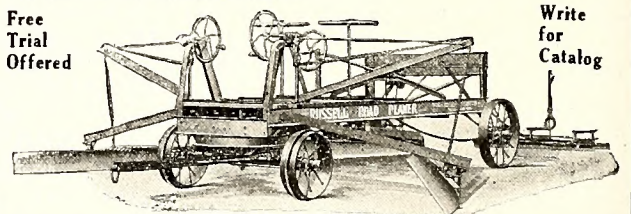
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# SOUTHERN GOOD ROADS

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## The New Birmingham Speedway

By MISS ALMA RITTENBERRY

**T**HE Birmingham Motor Speedway Company is building the finest Speedway in the world, in location, scenic effect and style of construction.

It is being built around the Birmingham Motor & Country Club's Lake, which is one and a quarter miles long and about one-quarter of a mile wide, with about one hundred and fifty acres of land planned for beautiful home sites on the hills overlooking the Lake.

It will be of special construction with a two mile lap

quickly and easily handled without confusion.

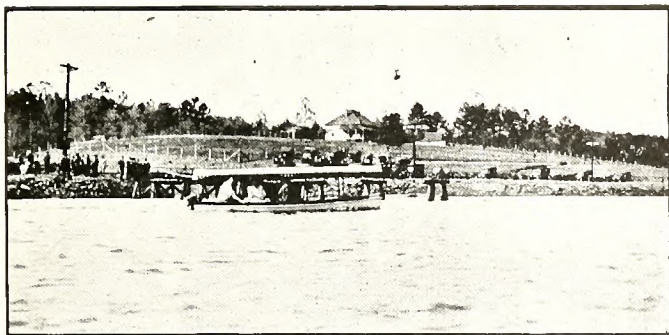
The roadways leading from Birmingham to the Speedway are paved with chert and are maintained in splendid condition by the county. Short connections with nearby pike roads will be made, and present roads widened, enabling the autoists to avoid congestion common at other speedways, and to reach the city fifteen minutes after the races.

### Cost Over Half Million.

The cost of the Speedway together with the other improvements noted above and including all expenses, such as salaries, office rent and expenses, engineering, architect's fees, commissions, advertising, etc., is estimated to be \$500,000 to \$700,000.

The contract has been let for the construction of the entire work, to one of the largest contracting firms in the United States, to be completed and ready for races this fall.

All construction work will be under the supervision



View of Birmingham Speedway and Lake, From Club House

over the regular course, and two and one-half miles with the hairpin turns and skidding curves.

The course will be one hundred feet in width, consisting of a track of reinforced concrete, with sod safety zones on each side, thus minimizing the danger to the drivers.

Grand stands and boxes of the latest approved construction will be built with a capacity of fifty to seventy-five thousand people, and owing to the natural advantages of this location, every seat will command a full view of all the cars from start to finish.

A very unique feature, and one to produce large revenue, will be Barge and Boat seats on the Lake for those who wish to watch the races from the Lake and maybe follow the cars in a leisurely fashion and see each race from different points of view.

Ample supply and repair pits, judge's stands, parking spaces, concession booths and stands, and all necessary buildings, fences, roadways, etc., with water-works, electric lights and toilets, sewers, etc., will be provided.

Terminal facilities for both electric car lines and steam railroad, double track, (the L. & N. Railway) will be so provided that the maximum crowds can be



Lake at Motor and Country Club the Speedway Will Encircle

of an expert in cement construction, who is also experienced in Speedway construction and operation.

In October or early November the first race, of one day, will be held. Another race will be held early next spring and two races or more each year thereafter.

These races will follow after the events on Northern Speedways and will catch the early winter travel to the Southern resorts, and add further incentive to autoists from all over the North, East and West to tour to

Birmingham and the South after it is too cold to tour in the North.

The construction of good roads in Alabama and the South will proceed with amazing swiftness under the pressure of such increased travel and the desire of the Southern people to retain and encourage this travel after they once taste the prosperity that follows in the wake of these big spenders.

The building of the Birmingham Speedway gives an impetus and renewed interest in the coming of the Jackson Highway through Birmingham, which has its northern terminus in Chicago and its Southern terminus in New Orleans. There will be three Speedways on the Jackson Highway, Chicago, Indianapolis and Birmingham. The Forest Highway from Rome, Ga., to Birmingham, Ala., and the Chattanooga Highway from Chattanooga to Birmingham, when completed, will bring a large contingent of Northern tourists to the Magic City of the South.

The nine trunk-line railroads into Birmingham from all directions, reach within a five or six hours run, approximately five million people, and added to the two hundred thousand population of Birmingham, the best sport-loving city in the United States per capita, as shown by the base ball records, and the additional one hundred thousand in Jefferson county at Birmingham's doorstep, it is not assuming too much to estimate an attendance of not less than seventy-five thousand at each race or one hundred and fifty thousand per year.

The history of other Speedways is that the receipts from the preliminary or qualifying races the week before each big race, with the concessions, etc., more than pay for all prizes and the cost of advertising and all other expenses of the races, thus leaving the gate receipts and grand stand receipts net profit.

#### **Speedways Draw the Cash.**

One hundred and fifty thousand attendance for the year, at an average of \$4 each (which is from one to three dollars lower than the average at northern

courses) is six hundred thousand dollars profit per year, or sixty per cent on each stockholder's investment. This is conservative in comparison with the Indianapolis course where ninety per cent or more has been made on a million dollar capital.

The effect of this large attendance, and it will grow greater each year, will be crowded hotels in Birmingham, boarding-house running over, and private houses being pressed into service to care for the overflow, as in Indianapolis and other Speedway cities.

The railroads will make low rates and bring thousands and thousands to Birmingham to see the races and others will take advantage of the cheap rates to do their shopping in Birmingham. The merchants will enjoy increased sales, and cafes, garages and every class of business in the city will enjoy prosperity as the result of this Speedway.

For weeks before each race, representatives of the manufacturers of automobiles and accessories will arrive to demonstrate their wares.

Offices and store-houses will be in demand, and real estate will enhance in value.

Large number of spectators will come several days before the races and stay a few days after, and assuming twenty-five thousand come for each race and spend only ten dollars a day for hotel expenses (excluding purchases) Birmingham will be nearly two million dollars a year richer, by money not now spent in Birmingham.

#### **Only Speedway in South.**

There are fourteen Speedways in cities of the North, East and West, and there are three more under construction. There is not one in the whole South.

The Indianapolis Speedway, located eight miles from the city, was built about seven years ago, at a cost of one million dollars and has had an average paid attendance of more than one hundred thousand people per race ever since it was built, paying a dividend of from



Preparing For Reinforced Concrete on Birmingham Speedway

fifty per cent to seventy-five per cent per annum on a million dollar capital.

The Chicago Speedway Company in 1915 built a two-mile track eighteen miles out costing one million dollars, and took in more than four hundred thousand dollars at the first race.

The New York Speedway, also a two-mile track, and about twenty-eight miles out, but capitalized at three million and five hundred thousand dollars, paid a thirty-five per cent dividend last year on this large capital.



Birmingham Motor and Country Club, Birmingham, Ala.

The history of all these speedways is that the earnings have been enormous, and each one is owned and controlled by only a few rich men and the small investor has been unable to buy speedway stock.

The Birmingham Motor Speedway Company invites the support of the small investors as well as the large ones. The stock in this Speedway will undoubtedly pay handsome dividends.

#### An Example For Roadbuilders.

That was a notable example set by the men of Tennessee, who, to the number of 20,000, and with 5,000 teams, set to work and achieved much in the way of improved results for the people of the state and country, when they gathered in one day and worked like heroes on the estate's stretch of the new Duluth to New Orleans highway. Every man was a volunteer. There was no semblance of compulsion employed in the entire movement. There were farmers, lawyers, merchants, clerks, and, in fact, representatives of almost every calling in the hustling lineup. And the character of the work done is said to have been first class. The heat was trying, but no prostrations nor sicknesses were reported. And the reward of such application is manifest already, not alone in the work on the road, but also and especially in the value of the effective advertising of the enterprise of the state whose people did it.

Tennessee has not ranked among the leaders in good roads movements, but it soon will at this rate. Like some other sections that are named here, there is much need for a forward range. The sure way to get such things done is to interest all classes of the people in the beneficial results certain to ensue. The turnout along the new north and south trunk line indicates that the people have been stirred to a point where they realize that highway improvement is a valuable asset to a community and state.

Every one of the 20,000 men who gave time and effort to help improve that road will be an active worker in the good roads cause. These men and their influ-

ence will make it easier to get good roads laws and appropriations. Public sentiment is the foundation of better highways in any state. The first thing to be done is to awaken the people to what is needed, and that is being done by the Tennessee volunteers.

#### Enlarged Future for Motor Cars.

Interesting figures have been compiled of late to show the future possibilities of the motor car business. The necessity of the automobile in business life, the need of the motor car for the man of every phase of business, has come to be recognized by the big financial interests. These opportunities of profitable investment in the industry are recognized and are being taken advantages of by financiers generally.

P. W. Andrews, with interests closely allied with several companies, has had compiled a list of farmers and business men who are not automobile owners today and has found that no less than 5,000,000 farmers and 6,000,000 business men do not own motor cars today.

That is a total of 11,000,000 men who are certain buyers for the future in the regular run of things, for as the automobile increases its scope, it will become a necessity for every one.

Progress being made in the good roads movement for which the government has just appropriated \$75,000,000, to which amount the states must add a like sum to participate, is also of interest to the capitalists who would invest in the motor car field.

Again there are 2,500,000 automobiles, in round numbers, in use and one of every five of this number will have to be replaced yearly, which insures an output, without any increase in the number of users, of 500,000 cars every year. That is eight times the output of cars of 1906, or only ten years ago.

Within the next three years the total of cars in use in America will be nearly 8,000,000, and replacements of one car for every five in use will mean an output equal to the automobile manufacture record of 1916.

With the war's close in Europe will come an immense market for cars all over the world and demands will be for rush delivery to all warring countries for cars will be as necessary there as in other lands, owing to the rush, immediately peace is declared to build up business conditions once more and re-establish generally.

There is seemingly coming a day when the rapidly increasing business will have to be curtailed somewhere, when manufacturers will have to limit their annual output to the demand, when the organization of new it will be the survival of the fittest in the field at present that day seems far away.

#### A Good Roads Handshake.

It has been definitely decided that the Sheridan road celebration which will be participated in by Wisconsin and Illinois good roads enthusiasts, will be held some time in September. One big event will be Gov. Philip of Wisconsin shaking hands with Gov. Dunne of Illinois across the state line. On that same date rousing meetings will be held at Waukegan, Zion City and Kenosha. Exceptional progress is being noted on this great highway between Milwaukee and Chicago.

The directors of the Dixie Highway Association met August 25, in Detroit, and discussed jubilantly important successes in securing new pieces of construction.

# State Aid Road Work in Kentucky For 1916

By **RODMAN WILEY**

**T**HERE is available for State Aid Road work in Kentucky, for 1916, approximately \$712,000, exclusive of the amount to be received from the Federal Aid Act, which will be about \$100,000. Of this amount, it is estimated that \$547,000 will be furnished by the five cent state tax, and approximately \$175,000 will accrue from the motor license fund. This fund is apportioned to the counties in the ratio the amount of

\$250,000; Rockcastle, \$100,000; Scott, \$100,000; Laurel, \$100,000; Nicholas, \$25,000; Clinton, \$40,000; Russell, \$50,000; Carroll, \$50,000; Boyd, \$500,000; Mason, \$300,000; Pulaski, \$300,000; Hopkins, \$300,000; Daviess, \$600,000; Kenton, \$250,000; Carter, \$150,000; Campbell, \$200,000; Oldham, \$10,000; Meade, \$10,000; Menifee, \$50,000; Trigg, \$50,000; Lincoln, \$50,000; Bracken, \$40,000; Union, \$450,000; Christian, \$400,000.

The character of work varies from the relocation and improvement of earth roads, to the very highest type of road construction, such as bituminous, macadam, concrete and brick. Construction work is, at present,



Paris-Winchester Road, Bourbon County, Ky. 16-foot Span I-Beam Bridge. Total Cost, \$369.65. The low bid, \$380.00

taxes, levied and collected by any one county for the building and construction of roads, bears to the total amount of taxes levied and collected for building and construction of roads in the entire state. The amount of State Road Fund to be received by any one county, however, is limited to not more than 2% of the total amount of the State Road Fund. On the basis of this apportionment, the distribution of the State Road Fund to the various counties ranges from a minimum of \$1,000 to a maximum of approximately \$14,000.

Counties participating in state aid are required to put up an amount equal to that secured from the state, so that the total amount of work under the jurisdiction of the State Highway Department will be approximately \$1,500,000, exclusive of the amount of bond money expended under state supervision.

Of the one hundred and twenty counties in the state, one hundred and eight (108) have applied for and will participate in state aid work the present year. In addition to the amount of money to be expended for road work by the state, a large number of counties have voted bonds for road improvement. This money is being expended under state supervision, the counties expending this money to be reimbursed from year to year as the counties' pro rata parts are available from the State Road Fund, until the county shall have received one-half of the money so spent.

The total amount of money raised by bond issues, and being expended under state supervision, since the enactment of the State Aid Law, is \$6,275,000.

## Counties Voting Bonds.

The counties voting bonds, together with the amounts voted, are as follows:

Ballard, \$300,000; Fayette, \$300,000; Lewis, \$150,000; Breathitt, \$150,000; Greenup, \$200,000; Knox, \$200,000; Bell, \$250,000; Whitley, \$250,000; Harlan,



Snelbyville-Eminence Pike, Shelby County, Ky. Reconstruction work—Approximate Cost \$1,200.00 per mile.

being done on approximately eight hundred (800) miles of State Aid work.

## The Types of Bridges.

Particular attention is being given to the character and type of drainage structures on all state aid work. The policy of the department has been to build all bridges of a permanent nature up to a span of thirty (30) feet. This, of course, includes a greater per cent of all bridges which have been built. Reinforced concrete slab bridges are usually built for all spans up to sixteen (16) feet, but where concrete materials are cheap, this type has been used up to twenty (20) foot spans. Eye beams totally incased in concrete are used



Bridge Over Cumberland River, Bell County, Ky. Two 150 Foot Spans and One 50 Foot Span Concrete Substructure

between sixteen (16) and thirty (30) foot spans, and, owing to the fact that contractors in general are not familiar with reinforced concrete work, reinforced concrete "T" beams and through girders have been used but very little. Steel bridges are all designed to carry a fifteen (15) ton roller with a minimum width of roadway of sixteen (16) feet.

It is worthy of note that, of the total amount of money expended for bridges in the state during the year 1915, eighty-five (85) per cent of this amount was expended for permanent bridges.

#### State Convicts on Roads.

A law providing for the working of state convicts on State Aid Roads was passed at the last session of the general assembly. The care, guarding and maintenance of all convicts so employed is under the jurisdiction of the state board of prison commissioners, and the State Road Department pays to the prison board the sum of \$1.00 per day for all convicts so employed. The efficiency of this system of labor and method of working the convicts will be tested on work in Bell county. Convict quarters, modern and sanitary in every respect, sufficient to accommodate seventy-five (75) men have been constructed in the vicinity of Pineville, and the work will consist mainly of quarrying and surfacing the section of road from Pineville to Middlesboro. Inasmuch as this will probably be the only convict labor used during the present year, the results obtained

on this work will be watched with a great deal of interest.

The results so far obtained and the increasing demand for participation in the state aid allotment by the various counties, would indicate that state aid work, as a whole, in the state of Kentucky, has been a success.

#### An Example of Road Values.

Money spent in road improvement of the right kind is making a profit of 125 per cent a year in Wayne county, Mich. The county spent \$2,000,000 on construction and maintenance during the eight years from 1906 to 1914, inclusive, and in this period the assessed valuation of property in the county, outside of the city of Detroit, increased from \$62,707,000 to \$114,548,120, or 82.6 per cent.

Of this increase 35 per cent, or \$22,000,000, is credited to road improvement because the assessed valuation of Detroit increased only 47.7 per cent. The increase in county valuation above the rate of increase in the city was eleven times the cost of road work, or 1,000 per cent profit in eight years on the total investment in improved roads.

The Hinds county, Miss., board of supervisors have been asked to increase the road bond issue for that county from \$100,000 to \$200,000 to provide adequate funds for completing roads planned.



Top Soil Road in Surry County, North Carolina

## Surry County, North Carolina, Roads

By JOSEPH HYDE PRATT, State Geologist

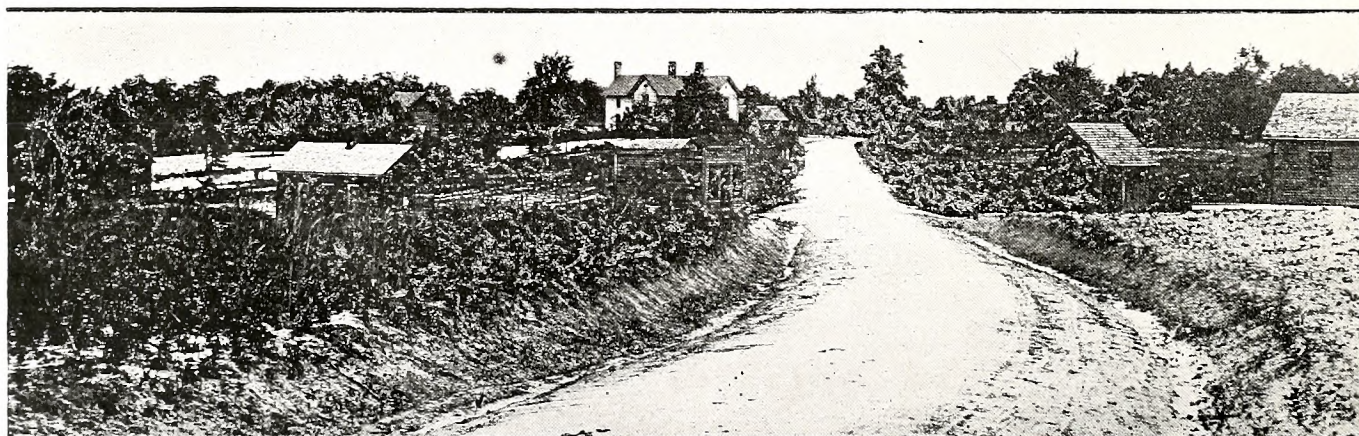
IT WAS ONLY a few years ago that Surry County, which lies on the east slope of the Blue Ridge, was without a mile of good road in the county. Mount Airy township started the good road movement by voting a township bond issue of \$80,000. This township is the wealthiest in the county, containing the city of Mount Airy. The township bond issue was not resorted to until a county bond issue had been thoroughly discussed and it had been shown conclusively that the county would not consider favorably the passage of a bond issue for roads. The Mount Airy Township bond issue was carried by a good majority and the money was spent in building some splendid roads throughout the township. The result of this election and the use of the bond money was watched by the other townships as to whether or not it was a good thing. Evidently it was considered a wise move on the part of Mount Airy township, for 10 other townships in the county followed Mount Airy's example and voted good roads bonds aggregating \$270,000. This made a total of 11 out of the 14 townships of the county which have voted good roads bonds, making a total aggregate of \$350,000 for good roads. With these bond issues there have been built or there is in the process of construction 235 miles of graded topsoil highway in the 11 townships. In addition, the county has built 75 steel bridges at a cost of something over \$100,000. This has all been accom-

plished in four years, and now the question is being discussed of voting on a county bond issue with which to refund the township bonds and give an additional amount with which to build roads in the other three townships and a few miles of additional roads in some of the 11 townships which have already issued bonds. Indications are that such a bond issue would pass by an overwhelming majority.

With the construction of these good roads, there began in the county an industrial improvement which was phenomenal. Five years ago the valuation of property in Surry county was estimated at \$8,000,000. Today it is estimated at over \$20,000,000. While this remarkable increase is not due entirely to the construction of good roads, there is no doubt whatever but that it is largely due to this one factor.

The county is to be congratulated on the wonderful progress which it has made.

It is now assisting in every way possible to have roads constructed in adjoining counties, not only in North Carolina but in Virginia, so that Surry county will be crossed by roads that will be inter-county and interstate, as the county realizes that it has a further opportunity for industrial development if such roads can be built in the adjoining counties. The county showed its interest by sending a large delegation to the good roads rally held at Hillsville, Virginia, on August 10th.



Mount Airy-Dobson Highway, Surry County, North Carolina

As a result of this meeting, Carroll county Virginia is considering a bond issue of \$200,000 of which \$100,000 or as much thereof as is necessary, will be spent in the construction of a north and south road across the coun-



Topsoil Road, Mount Airy Township, Surry County, N. C.

ty, connecting the Surry county good road with the main highway extending from Bristol, Virginia, to Roanoke, Virginia, and Washington, D. C. The other \$100,000 of this bond issue will be spent in building

roads into this main highway across the county. This road will be an inter-state road and will put Mount Airy and Surry county on a main north and south National Highway, and should give them the benefit of a very large tourist trade. The county has also made arrangements for completing another road in first class condition to meet the road from Winston-Salem.

The work done in this county is well worth the consideration of other counties in northwestern North Carolina where the construction of roads is somewhat expensive on account of the mountainous country. Surry county has proved that it pays to build good roads. The county has also realized that it pays to maintain the roads after they are built, and it is now trying to perfect a method of maintenance which will insure the keeping up of the roads of the county in first class condition.

The photographs accompanying this article illustrate very well the type of roads which Surry county is building. These are topsoil or sand-clay roads and give a sufficiently hard surface to withstand the traffic that goes over them.

A survey has been completed for a highway running between Wilmington and Fayetteville, two important North Carolina cities. Portions of the road are already built.

The state of Kansas road authorities and local officials are jointly planning to finish up the good road between Lawrence and Leavenworth by pooling state, county and Federal road funds.



Mount Airy Township, Surry County, North Carolina, Top Soil Road

# Cause of Defects in Grouted Granite Rock

By C. D. POLLOCK

Consulting Engineer, New York City

**S**INCE the advent of improved granite block pavements there have developed certain defects which were not noticed or did not occur with the old style wide jointed granite block pavements.

Within the past few months the writer has had occasion to make a study of these defects, to determine if possible the cause, and then the remedy, for these flaws. First an examination was made of granite block pavements in general. It was found that defects, consisting of broken and loose blocks, often only a single block, and then again two or more adjacent ones, did not occur where some form of bituminous filler had been used, nor did it occur where the joint filler was simply sand, but the defects were found only in some of the pavements where cement grout had been used as the joint filler. Next it was observed that the defects did not always develop when the joints consisted of cement grout.

A good many paving engineers believed that the trouble was due to a few soft or outcrop blocks getting mixed in with the good blocks. A careful examination was next made of numerous places in pavements in several cities. The examination showed that where the pavement was generally first class, there was occasionally a small spot where one or two blocks would be broken or cracked, often the cracks had the appearance of laminations. Sometimes it would be found that more blocks were broken, but usually there was only a small place, like a pot hole, as it might be termed. This was found to be the case with every kind of granite which had been used around New York City and vicinity, whether it was what is known as comparatively soft, medium or hard granite. These spots occurred at points where the grouting appeared to be in perfect condition for a considerable distance in all directions.

The fracture of the blocks was similar to that obtained in testing cubes for compression, and seemed to indicate that the trouble was due to pressure from expansion. Where the grout was poor and broken out, there were no broken blocks. Upon removing blocks from the pavements at these "pot holes" by beginning several blocks away from the broken ones, the grout was found to be good, and it had penetrated well down in the joints, but when the joint immediately adjacent to the broken block was reached, the grout proved to be good only for about one inch to one and one-quarter inches down from the top of the block, and was either very poor or else simply pea stone or gravel below this. In every case the break in the block followed very closely the bottom line of the good portion of the grout. In other words the top of the block had crushed and the bottom portion, where the grout was poor or missing entirely, remained intact. The blocks which were cracked and appeared laminated, proved to be whole and sound except for the top portion above the bottom line of the good grout. All this thoroughly backed up our theory that the cause of the fracture was the pressure being concentrated upon the small area of the good grout, and was not due to defective material in the blocks. Test cubes were made from the bottom portions of blocks which had crushed on top, selecting granites from various quarries, in order that we might have all degrees of hardness, or rather crushing strength. Up-

on crushing the cubes it was found that each was normal for the quarry from which it came. The range was from granites having a crushing strength of about 15,000 pounds per square inch to those having a crushing strength of over 30,000 and even 40,000 pounds. As further evidence that the crushing is due to expansion, one crushed block was removed from about the center of an actual bulge in the pavement, which had lifted from the sand cushion to a noticeable amount, and gave forth a hollow sound when struck with a sledge. This was toward the close of a very hot spell which succeeded heavy rains.

As already stated, where all the grout was poor, no broken blocks were found. But on the other hand where all of the grout was good, and filled the joints from the top to substantially the bottom of the blocks, such as in Worcester, Mass., upon Main St. and upon Front St., where a comparatively soft granite was used, not a single break has developed since the pavement was laid, nearly fifteen years ago, upon the former street, and about twelve years ago upon Front St.

## Soft Granite May Be Used.

To sum up the results of these examinations, it was found that the softest of the granites which are used for paving purposes do not crush from expansion if a good uniform grout is used and it is placed in the joint for practically its full depth, but the hardest of the granites will crush from expansion if the grout is not uniformly good and is not uniformly placed for the full depth in all the joints. In other words, these small defects in grouted granite block pavements are not due to hard or soft stone, but result from poor workmanship, and that alone. The remedy is simple. An even mixture of grout should be used, and this should be made to penetrate the joints uniformly to a depth nowhere less than three inches. With such a depth of good one to one grout, no blocks were found to have failed by crushing, not even where quite soft granite had been used. It is better to mix the grout by machine, and great care should be taken to secure a uniform product, about the consistency of thin cream. Preferably the grout should be delivered from the machine directly into the joints by means of a spout or a hose, in order that the sand may not separate out, as is very likely to be the case when wheelbarrows are used. Often the defects are caused by a careless workman occasionally dropping a shovel full of pea gravel in one spot and thus nearly filling the joints at such points, so that the grout cannot penetrate more than about an inch. Because of this it is usually better to omit the pea stone or gravel entirely. If there is no such material on the street, there is no temptation to use too much of it, and thus the work of inspection is simplified.

In conclusion we would say that if "pot holes" develop in your grouted granite block pavement, first look for the trouble in faulty workmanship, and do not blame the stone for something which should be remedied by careful inspection.

James county, Tenn., has joined its progressive neighbors by voting a bond issue for \$80,000 for beginning the construction of good roads. Owing to the nature of the country the macadam type will be adhered to.

## The Business Side of Road Building

**B**UYING good roads is a business transaction. Good bargainers get better road value for their money than poor bargainers. Poor bargainers usually do not know what good road value is. They see something they like in their travels and buy it for home use, without stopping to consider that this may be as ridiculous as to put on a dress suit to feed the cows. No man can make a good bargain for roads who does not know what is needed; yet a large part of the \$300,000,000 which is being spent on American roads this year is paid out by men who do not know what is a good bargain in roads. This is not wholly their fault, for little has ever been said about the real economics of road construction.

Nobody but a spendthrift thinks of spending more money than he has on something he needs. He fits his expenditures to his income, if he is sensible. A sensible road commission tries to do the same, but it is often hampered by a lack of knowledge of how to proceed. Detailed knowledge of this nature is only gained by wide observation, keen insight and shrewd judgment, and for this reason a competent state highway commission possessing such knowledge can render great aid to local authorities who apply to it for advice.

### Suit the Means to the Needs.

The first thing to be considered in buying good roads is the amount of money which it is wise for a community to spend for them. Most estimates of this nature are based on the existing annual tax receipts available for the purpose. This is not the best basis for a sound judgment. A family of three persons can make an income of \$1,800 go farther than a family of six persons can. It is the same with roads. To find out roughly how much money can be devoted to road work, it is best to divide the assessed valuation of the district by the miles of roads in it. This gives the valuation, or tax-

able wealth, of the district per mile of road. For instance, Lake county, Mich., has a valuation of only \$5,420 per mile, showing that not even the entire wealth of the county is sufficient to improve all its roads. Wayne county, Mich., on the other hand, has a valuation of \$514,931 per mile, indicating its financial ability to carry out any kind of road improvements in reason. In a rich agricultural district like Calhoun county, Mich., the valuation is \$52,294 per mile, indicating that it is financially able to construct whatever kind of main roads may be best suited for the travel on them.

We look with pity on the young saleswoman who spends all her money on clothes she does not need, which do not make her attractive to the clear thinking and thrifty young men of her acquaintance. We deplore the mortgage the clerk puts on his home to buy an automobile unnecessary for the welfare of his family. And yet we complain when a county with a very low valuation per road mile is not intersected with roads as smooth as the top of a billiard table. This shows that we have our foolish ideas, like the flighty saleswoman and the extravagant clerk. As a matter of fact, Lake County, Mich., is showing good judgment in restricting its road building to gravel roads costing \$2,000 a mile. The country is not able now to build roads costing \$16,000 a mile, as Wayne county is doing, and such expensive roads are probably not yet needed.

There is a measure of the need for roads, just as there is a measure of the financial resources for road-building. This measure is the travel the road is carrying now and the probable increase in the travel during the next five to ten years. The improvement of a country road results in the slow development of property along it, so that there is a slow annual increase in what is called the residential travel. If the road is on



Lawrenceburg-Harrisonburg Road, Anderson County, Ky.

a through route between important cities some distance apart there may or may not be a material increase in the foreign travel, by which is meant the travel between these cities. This can only be determined by a study of local conditions. The residential travel can be actually counted, however, and this ought to be done. The state highway department or the U. S. Office of Public Roads and Rural Engineering at Washington will furnish instructions for the work, which can be done by school children under the direction of their teachers. This is a kind of child labor which no reformers will weep over and the efficiency expert will approve.

#### Secure Expert Builders.

We have now found out something about our resources for road building and the travel our roads must carry. This brings us to the point where technical advice is needed. We are like the sick man with a little money laid aside, whose physician must recommend treatment within these means or he is not a professional man but just a pill peddler. For example, twenty years ago, when broken stone roads without any bituminous material to bind them answered all requirements, experience in the suburbs of large eastern cities indicated that the most durable roads there were constructed of trap rock. This is quite expensive, prohibitively expensive, in many parts of the country, but the idea became general that it was the best rock that could be employed under all conditions. This idea was broken down by the scientific investigations of the U. S. Office of Public Roads, which showed that trap rock was not so suitable for roads with light travel as other classes of rock, far more widely distributed than trap and consequently less expensive. Still later it was shown that roads without any rock at all, made of certain proportions of sand and clay, were actually better for very light traffic in some districts than roads with broken stone surfaces.

The travel over a road wears it out in different ways, according to the number and character of the vehicles, the relative proportion of horse-drawn vehicles and automobiles, the climatic conditions and the construction of the road. For the same travel, a road adopted for a moist section with cold winters is needlessly expensive for a dry section with little frost. Some types of roads wear out quickly but are easily maintained; other types withstand travel well but when they need repairs the work is expensive. All these things must be considered in determining the annual cost of a road, which is done in the following way.

The first element of this cost is the first cost of construction per mile of road, including all engineering expenses. Knowing the travel over the road, an expert can estimate the number of years such a road will serve its purpose, if properly maintained, before reconstruction is necessary. This cost divided by the number of years of service gives the annual first cost. To this must be added the annual interest on the first cost per mile and the annual payment into a fund which will be enough to reconstruct a mile of the road when it is worn out, or to retire the bonds that are sometimes issued to pay for the first cost. The annual cost per mile of maintaining the road in serviceable condition is the last item to be estimated. The sum of all these items is the total cost per mile of the road, and this figure is the most important one to the taxpayers. But another unit for measuring cost, which is sometimes very useful, is the cost of the road per vehicle mile. This is obtained by dividing the total annual cost per

mile by the number of vehicles using the road annually. The type of construction which gives the lowest cost per vehicle mile is generally the best to employ.

While the preceding notes explain the steps to be taken in buying a good road, they cannot supply the good judgment necessary to take the steps wisely. We admire the skill of a slack-rope gymnast but we are not foolish enough to emulate him. The skill and knowledge needed to select the right type of construction for a road are greater than those required by the slack-rope performer, and yet our minds are so warped by constant use of roads that we are strongly inclined to think we are able to do the work of road engineers. We will be losing money in our road buying until we stop this foolishness.

#### Drake to Make 25,000-Mile Tour.

Mr. J. W. Drake, of Detroit, Mich., and three companions representing the American Automobile Association left Washington on August 28 on what was planned to be the most extensive good roads tour ever made in this country.

"It is the object of this tour to promote interest in improved roads and capital to capital highways in all parts of the country," said Mr. Drake, before leaving Washington. "The Hupmobile, which will start from Washington Aug. 28, will carry a crew of four men. A distance of approximately 25,000 miles will be covered and a study will be made of road conditions and reports will be made to the governor of each state suggesting the most feasible roads for touring and road conditions encountered.

"This tour will lay the foundation of a series of interstate highways, joining all of the state capitals, the principal cities and the main scenic routes of the country. Through these reports, both written and photographic, combined with the co-operation of the American Automobile association, the various good roads associations and state and government officials, I believe this tour will create a personal and practical interest in road improvements such as the country has never seen.

"In the hands of the secretary of agriculture and Logan Waller Page, federal good roads commissioner the government appropriation will, without doubt, produce incalculable results in improving the road conditions of the country. Widespread road improvement is of perhaps greatest benefit to the motorist and it is possible to assure both federal and state authorities at this time of the heartiest co-operation of the multitude of people owning and riding in automobiles. No greater impetus can be given the 'see America first' idea than the development of the nation's highways. Through the tour we will tell the public by written reports, by photographs and by moving pictures the story of the nation's roads as they now exist, with suggestions for the best highway routes and the best tours to see the wonders of America."

Good roads enthusiasts predict that the tour will give the public the most wonderful photographic touring record of the United States which has ever been made. There will be little left to the imagination about American road conditions when the car Mr. Drake is sending from capital to capital is finally checked in at its destination. The immensity of this project in behalf of good roads is better understood when it is understood that the distance to be traveled will be greater than the distance around the world, and every mile of it is to be made in the United States.

# Progress On Dixie Highway

## Big Tour From Cincinnati or Detroit to Florida Planned For October

**J**UDGE M. M. ALLISON, president of the Dixie Highway association called the directors to meet with him in Detroit August 25. At this time the progress of the work on the Dixie Highway was thoroughly discussed and plans made for carrying forward the further improvement of this big artery of travel and commerce during the coming year. A big tour has been planned from Cincinnati to Jacksonville, to start from the former city on October 23. It is very likely that, owing to the many requests from Detroit, the trip may be made from Detroit, starting a few days earlier so as not to disarrange the original Cincinnati schedule. Cincinnati has promised to furnish 50 cars and a good band for the occasion.

The most notable achievement is the closing up of all of the gaps on the eastern division between Detroit and Chattanooga, of which the recent letting of the contract for the Monroe-Toledo link was an important feature. Numerous other improvements between Toledo and Cincinnati in the way of substitution of permanent paving for macadam road have been brought about through activities of the Dixie Highway association.

From Cincinnati to Chattanooga via Knoxville every county is now at work so that a well surfaced roadway from Detroit south is assured by the early part of 1917. Crossing the Ohio river, Kenton county, Kentucky, is adding to its mileage of concrete roads along the Dixie highway. Boone county recently voted \$200,000 to free the toll road and improve the highway. Grant county will soon complete the resurfacing the Dixie highway. Scott county has an extensive program of improvements for her link including a part of the mileage of asphalt macadam. Fayette county is busy providing a hard-surfaced roadway throughout the county in addition to preparing to secure the funds to join with Madison county in the construction, of a new Dixie Highway bridge over the Kentucky river.

### Work in Cumberland Mountains.

Madison county is improving its good road to Berea, where the Dixie highway leaves the Blue Grass to enter the Cumberland mountains.

Work was started by Madison and Roekcastle counties July 27 on the important link between Berea and Mt. Vernon. Roekcastle county is spending \$90,000 out of a \$100,000 bond issue on the Dixie highway. Laurel county, adjoining, with her \$100,000 is engaged in building a splendid road to Corbin across Wild Cat mountain, utilizing thirteen miles of abandoned railroad grade. Knox county, which has been at a variance with the Kentucky highway department for a year relative to the routing of the Dixie highway in that county, has reached a satisfactory agreement and contracts have just been awarded for the construction of the entire mileage of the highway through the county, with \$200,000 available.

Bell county recently secured two hundred convicts from the state to complete the Dixie highway from Pineville to the Knox county line. This county has the highway graded and surfaced from the Tennessee line to Pineville. Clairborne county, Tennessee, with the proceeds of a bond issue totalling \$375,000 is building the Dixie highway through that county. Union county recently awarded the contracts for the construction of

the Dixie highway through that county, out of \$100,000 bond issue, and the work has been started. Knox county has just completed the expenditure of \$500,000 which provided for the Dixie highway. A splendid road now exists between Knoxville and Chattanooga with only four miles of surfacing to complete.

### Good Roads in Georgia.

Good roads over the three Georgia divisions of the Dixie highway now exists between Chattanooga and Florida through the state of Georgia. Every county in Florida is making extensive improvements under the impetus of the Dixie highway enthusiasm. As an example, the association brought about the complete provision for the construction of the link between Tallahassee and Gainesville, Fla., which has been a serious drawback to through travel to west coast points.

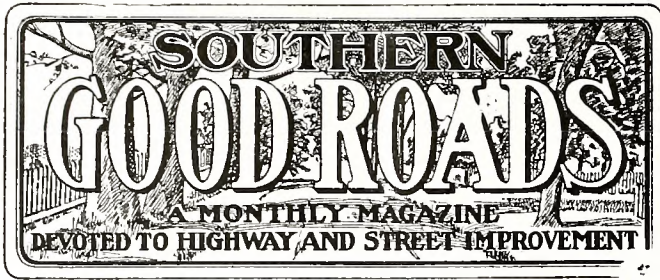
On the western division the association has been equally successful. Seven counties between Nashville and Chattanooga are now at work building an entire new highway from Murfreesboro to Chattanooga, which will be completed early in 1917, providing the tourists from the north going south via Nashville and Chattanooga a well-surfaced road, free from tolls and ferry, which will replace the present road, which is impassable in bad weather, and a serious handicap to through travel from the north to the south. As a result of the activities of the association, the old Louisville and Nashville pike, which has been a terror to the pioneers who have come south during the past few years, is in good travelable condition, with only 20 miles remaining to be surfaced of the entire mileage. The funds are in hand for this, and a well-improved roadway the entire distance will be provided by fall.

### Texas Teaches Good Roads.

Southern Good Roads is in receipt of a letter from Prof. R. L. Morrison, of the School of Engineering, University of Texas, which brings the information that Texas was the first state in America to establish a school for teaching road building, this being the University department. Today there are three members of the faculty assigned to this work and the school is probably the largest in the country with the exception of the highway engineering department of Columbia University. Mr. Geo. D. Marshall of the Office of Public Roads, who had been detailed to the Texas University school is no longer with the college. He is succeeded by Mr. Roy M. Green, recently appointed Assistant Professor of Highway Engineering. Prof. Green, whose appointment became effective September 1st, will be primarily in charge of road laboratory work. This department is fully equipped with machinery and apparatus for laboratory and actual demonstration in construction of the various types.

The Board of Revenue of Bessemer, Ala., has been busying itself of late weeks in putting into good condition roads around that city, which were damaged considerably by the excessive rains in Alabama.

Citizens of Kawanee and Toombs, in Mississippi, have decided to extend the Dixie Overland Highway to the Alabama line, in the direction of Selma.



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No. 3.

**WATCH FOR POLITICS.**

Every county or state in the South with a road building program in view would do well to keep a sharp eye this year for political motives. A good percentage of our communities have learned their lesson, either from their own mistakes or the errors of communities around them, and have gone at the road problem from the practical and scientific standpoint. This year there will be slick politicians who hope to ride to legislatures on the issue of good roads, who care nothing about good roads and will not follow the advice of persons informed. The old cry of "local self-government" will be injected into road issues, and some folks will be foolish enough to bite in haste, and then repent for years to come when their roads are constructed with no other view than spending the money where somebody will get a "rake-off" or special benefit. Some voters will be found who have become disgruntled because road commissions could not do just what they wanted and for spite and selfishness will vote to tear down systems. Others there are who will place party success above community benefit and will be happy to place roads into politics. But there are a great many other men, patriotic, and wise enough when awake, who are likely to be asleep at the switch until they find themselves the victims of slick schemers who have walked to political success over the slain body of the community's

best interest. These are the men we would appeal to in order that they may keep the track of progress clear and demand of all candidates an unequivocal statement of where they stand on the road question.

Most of the Legislatures in Southern states will be chosen this year, and in each of these assemblies the road question is going to be one of the paramount issues. Federal aid demands that the road work of the states and counties be centralized and thoroughly systematized, and the work of the Legislatures along this line is going to be highly important to the voters. There is no bigger question for the South than good roads and no candidate should be allowed to go through a campaign without an expression of where he stands.

**A NARROW SECTIONAL UTTERANCE.**

It remains for the Boston Post to express the meanest, narrowest, sectional comment on the Federal Aid law that has come under our notice. Generally throughout the North, East, West and South editors of every creed have praised the law that brings Federal aid to road building in the states. With almost unanimity the editorial writers have taken a non-partisan view, a patriotic view, of this measure that was passed by both Houses of Congress with an overwhelming vote from men of both predominant parties. In characterizing this measure as an advertising scheme, the Post says:

"There is the Wilson administration's \$75,000,000 good roads measure, which is expected to build many miles of fine road in the South and West, where the States have neglected the work and where votes frequently grow by the roadside."

Following this outbreak the Post goes further and calls the Bankhead bill a contribution to the "pork barrel fund." The editor of the Post is no doubt informed that his characterization of this law is absolutely untrue, but it would not serve his narrow end to tell the whole truth about the matter. The Federal aid bill is not sectional because it so happens that the large states that get the bulk of the appropriations happen to be in the West and South. The Post should not forget that for many decades New England has grown rich because of Federal laws that bestowed especial favors on that section. There is no state in the Union that has received more favor from Federal law than has Massachusetts and the benefit that will go to the West and the South through Federal road aid is a mere pittance to the benefit that New England has secured through Federal protection of her every interest.

When he speaks of those states that have "neglected" their roads, we wonder if the Post editor ever considered that some of these states are many times the size of Massachusetts, with only a fractional part of her wealth. And does he not know that Massachusetts has been enabled to get rich and build fine roads to every section because of favors that were not extended to other states. It is precious little aid that the great

agricultural states have heretofore gotten from Washington and that section that would begrudge the crumb thrown to them is indeed of a selfish nature. If wealth counted, Massachusetts would get more than most other states, for her resources are developed. But the Bankhead bill is designed to help those states that most need aid and whose development will be more rapid with the building of good roads. The Post will not gain much respect from editorials of this kind.

### Care in Expending Federal Funds.

Thirty-five states sent representatives to the August conference in Washington called by the Secretary of Agriculture to discuss the rules and regulations for the operation of the Federal Aid road act.

Colorado, Delaware, Georgia, Missouri, New Hampshire, Nevada North Dakota, Texas, Utah, Washington, Wisconsin, South Carolina and Wyoming were the thirteen states which were unrepresented. Of these, Georgia, Texas, and South Carolina have yet to provide themselves with state highway departments in order to qualify for participation in the \$75,000,000 Federal appropriation, to be expended in the next five years. Though Indiana also has to provide a state highway commission, Governor Ralston sent Carl G. Fisher to the conference as the Hoosier spokesman.

In the course of his address Secretary of Agriculture Houston said "You highway officials represent the states. I represent the Federal government. Together we are charged with the execution of a very difficult and very important law.

"This law appeals to me as of especial importance, not so much because it carries with it out of the Federal treasury an appropriation of \$85,000,000, not because it will be met by appropriation of \$75,000,000, or more out of the State funds, if all the states accept this act, but because as great as is the aggregate, it is relatively insignificant in comparison with amounts the States are now annually expending and will spend during the period covered by the Act.

"The main question that I am immediately concerned with, that the people of the Union are immediately concerned with, is whether we shall get a dollar's result for every dollar we expend for roads. I am quite sure that if we do so, and we can convince the people that we have done so, they will be willing to put much more money into good roads where they are needed. Therefore, the matter of administering this law, of devising good road systems, of careful selection of roads, of formulating projects, of developing plans and specifications, of having all matters considered on their merit by competent men, seem to me to lie at the root of this business.

"If, as the result of this act, the people are induced fully to realize the necessity of placing skillful and experienced men in charge of road building and road maintenance, a great advance will have been made and the efforts of those who labored to secure the legislation will have been rewarded."

### Autos and Good Roads Are Twins.

Over a billion dollars is spent every year in this country for good roads, writes L. T. Johnson in the Detroit Free Press. The cost to build one mile of good road is \$9,000. New England alone has spent \$9,000,000 to make her highways the equal of Europe's. New York is going to spend \$187,000,000. You can step into an

automobile today in New York and motor to San Francisco. For the largest part of your journey you will have good roads. Six years ago this was impossible. Two national motor highways cross the country east and west, north and south. The government has completed a motor highway for the Yellowstone park. Great parkways stretch out from our large cities for hundreds of miles. States, counties, townships, village boards, have all developed a new conscience. It is a conscience for good roads. The military authorities of the United States are vitally interested in the movement. In one county of Nevada where only 1,500 people live \$50,000 was raised for good roads. Good roads are an important factor in our national defense. France won the battle of the Marne with good roads. Joffre's reserve army was transported in taxicabs to attack the Germans' right flank. They got there in the nick of time because in France there are good roads.

The automobile has conquered. When it first came out the opinion was given that the automobile would never reach a wide popularity for two reasons—horses and bad roads. To say that the automobile has supplanted the horse is trite. But what is more important is that the automobile has conquered the roads; the roads have not conquered the automobile.

Because of the good roads people are now taking their vacations in automobiles. Farmers in the middle west many of them, now carry their products to market in automobiles. Good roads is the answer. Every year sees one more surrey and buckboard go into the scrap heap. The rural population is buying light, cheap automobiles. Good roads! In Kansas there is an automobile to every family. Good roads! Last year 200,000 automobile tourists visited the state of New York, spending considerable wads of money there. Good roads brought them. The motorists of Florida will soon take trips to Chicago or Louisiana. Good roads are in the course of construction.

At present there are three big projects under way—the Lincoln highway, the Dixie highway and the extension of the Northwest trail. These projects are national. They link up widely separated parts of the country. They join the Pacific with the Atlantic, the great lakes with the gulf. They are all enterprises made possible only through public spirit. Millions of dollars have been poured into their treasuries by farmers and by men of the cities. They are propositions that have touched both civic pride and selfish interest. They have got down to the people. It is the people who have made them possible. It is the people's imagination that has responded to their plans—a fine road passing your home, a fine road over which you can take your goods to market, a fine road for your little car.

### New Military Road Planned.

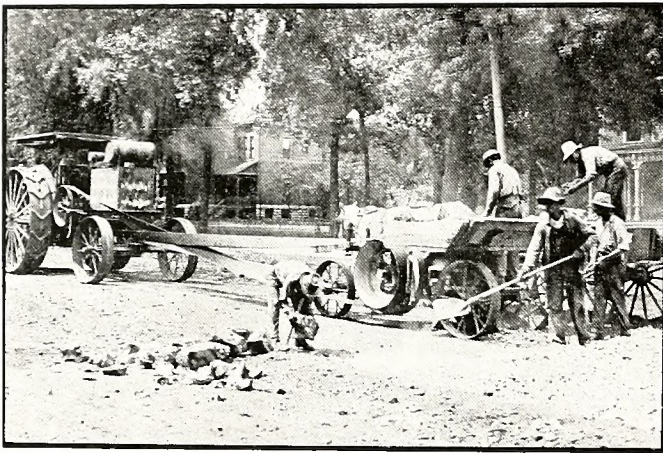
Plans for a fine military road constructed between Washington and Newport News, Va., are to be considered by the board of directors of the Chamber of Commerce at an early date. A letter suggesting the building of such a road has just been received by the Washington organization from the chamber of commerce of Newport News.

President P. T. Moran has written a personal letter to each member concerning the plans and hopes of the Chamber of Commerce for the coming months, and is now receiving scores of replies. Mr. Moran is making sure that interest in the work of the organization shall be maintained throughout the rest of the year.

# 365-Day Road Club Explained

By J. D. CLARKSON

ORIGINALLY the 365 Day Road Club was a combination of one hundred and twenty men and seven thousand two hundred dollars (each member paying five dollars a month, \$60.00 a year) for the purpose of aiding in the building of roads leading into Carthage, Missouri, that could be used with safety, profit and comfort 365 days in the year. The second year it was a combination of one hundred forty men and eight thousand four hundred dollars. During the third year of its existence and the fourth year, just closing, the palpable and hidden forces brought into action on road building operations had developed enough power to run on momentum so far as membership fees were concerned. It was not necessary to collect any dues from members in 1913 and 1914. A clear understanding of how this was accomplished would require explanation



"365-Day Road Club" in Action

too lengthy for this article and we will therefore have to be content with the statement that during the last two years when the membership of the Club were paying no dues more miles of road were constructed and maintained and greater constructive forces were brought to bear on the subject of road building than in the two years when membership fees were being paid. From this experience we have deducted one definite conclusion and that is, that while the money subscribed during the first two years was a very necessary ingredient in the combination of forces employed it was neither the largest or most valuable element producing the results. A suggestion of what these forces were may be gained by a study of one of the 365 Day Road Club's cardinal doctrines: "Put the people in your problem."

So strongly is this idea growing upon us that we are thinking of reorganizing the Club, each member to pay 365 dimes in money and 365 minutes in time as his contribution to the work for the next year. Our experience teaches that we can get as good results out of this combination as we could get out of four times the money minus the minutes. (See foot note.)

Prior to the formation of our Club it had been the custom here, as in many other localities, for the road men to build a piece of road and treat it like a monument in the cemetery, returning to it only in hours of grief. The name of the 365 Day Road Club was selected with malice aforethought so that every time it was

seen or used or remembered it would silently teach the doctrine that eternal vigilance is the price demanded for roads as well as the price demanded for liberty. To paraphrase an old saying, "Go to the ant, thou road man, learn of her ways and be wise." Disturb an ant hill and see how quickly repairs will be commenced.

## Holds to Maintenance.

Another cardinal principle of the Club is "Hold what we have, get what we can." Putting this in practice fifty per cent of available road funds are put into "Maintenance account" and the other fifty per cent is allotted to "New Construction."

When the Club was formed four years ago the roads in this locality consisted of disjointed sections of good roads with bad places of greater or less extent between the good parts. In bad weather these good parts stuck up like a Blue Sky bridge in a flood: Of little or no use till the bad places got fordable. We now have a system of good gravel roads in Jasper county surrounding Carthage and connecting the farming districts of the rest of the county with the mining districts in the west part over which motor cars or heavily loaded wagons can run 365 days of the year. One of these motor cars could run continuously for three days (Union Time) at a rate of 25 miles an hour without retracing its track or getting off the gravel of our road system.

Much complaint is heard throughout the land of high taxes, and politicians gain elections by promising relief and devise systems of indirect taxation to fool the people into the belief that they have made good the promise. Notwithstanding this the Road Club has put into successful operation a system of the most direct taxation. Neighborhoods call meetings, assess themselves, guarantee the levy and do their own collecting.

The Club purchased and now owns two large traction engines which are kept at work in construction and maintenance work. The purchase, ownership and use of these engines proved a great factor in the early exploits of the Club and solved some problems with ease that would otherwise have been difficult. And now as they make their periodical trips from one part of our road system to another they serve the same purpose for our work, as do the signs one sees on bank windows serve the purpose of the banker. The signs one sees on bank windows read something like this: "Capital \$100,000." "Surplus \$100,000." "Stockholders Liability \$100,000." "U. S. Repository." "Member Federal Bank Reserve Bank."

The 365 Day Road Club preaches good business principles and tries to practice them. The wise business man holds and increases his trade by giving bargains. The Club has introduced such economies in road building that every one who has contributed to its support feels that he got a bargain for his money and is encouraged to go to the same place for more goods of that class and tell his friends about it. The most substantial proof the Club has received that it has practiced this precept is the fact that there are already on file donations sufficient to secure the construction of eleven and one half miles of road as soon as spring opens. A line of people in front of a bank before opening time might mean that no great confidence was placed in the signs on the windows but a line of people in front of a merchant's door

before opening time would be construed by the passer-by as the sign of bargains to be had within. So when the farmers will line up months before opening time with contributions to build roads, is it not reasonable to suppose that bargains are to be had within?

#### Lazy Dollars of Little Use.

A lazy dollar is of as little use to a bank as a lazy man is on a farm. The Club has made every dollar in its treasury do the work of four and the lazy man has to speed up to get a look at the dollar as it goes past.

In a broad sense the 365 Day Road Club is a community in action, the dividends of the transaction in the way of benefits going back to the whole community and not to the few.

Can the 365 Day Road Club Idea be adapted to other states? Yes; wherever there are live people. It could not be worked successfully in a cemetery. Live people is the main ingredient. Wherever there is a live community the Club idea will produce just as good roads as they deserve. It will not make boulevards out of bogs but it will make 365 Day Roads wherever there are people to use the roads enough to keep the grass and weeds from growing between the wheel tracks. Neither is it any great metaphysical mystery. Any man of ordinary intelligence who will give it one hour's attention and study can possess its secret. It is as simple as a Ford motor and just as easily understood and reliable. In its practical working in our locality the banker has seen it turn liabilities into resources and the farmer has seen it turn barren into fertile fields, and the donor has seen his donations turned into a fund of cash sufficient to buy a horse and wagon.

During the recent flip-flops in wheat prices, our people did not have to consider road conditions in marketing their wheat. When the telephone brought the news of a satisfactory price the road was ready, 365 days in the year.

Foot Note. If more of our charitable societies were organized and working along this line—every dime of contribution to be accompanied by a minute of kindly and helpful thought some of them could soon be running on momentum and willing workers would be receiving living wages instead of wasting time hunting soup houses.

#### Georgia's "Near" Highway Commission.

The Georgia legislature at its recent session passed a bill making a bid for Federal aid for road construction. This state has no highway commission and hence was shut out from participation in these funds, which amounted to more than any other Southern state except Texas, which likewise has no highway commission. Several really effective bills to create a highway commission that would benefit the state were introduced, but these were easily sidetracked by a make-shift substitute. This substitute measure, which clothed the state prison board with the powers of the highway commission, provided no extra funds for highway work and for no additional engineering. It created the name out of a board that already existed for other purposes. The press all over Georgia laughed it the house when it passed this substitute by a large measure, practically all the newspaper men professing to believe that the senate would certainly kill the substitute or strengthen it so as to be effective. The following news story from the Atlanta Constitution of August 11, tells of what Georgia finally got:

"The same highway commission bill which passed the house recently and which was characterized at that

time as 'a zero with the rim rubbed off,' so woefully lacking it was in any provisions that created a highway commission worthy of the name, was passed by the senate Friday morning by vote of 35 to 3.

"The bill was unaltered in any particular except for an amendment by Senator Stovall, of the Thirteenth. This amendment enlarges the personnel of the commission, including besides the state prison commission, the state geologist, the dean of the college of civil engineering at the University of Georgia, and the professor of highway engineering at the Georgia school of Technology.

"This amendment was adopted. Otherwise, the bill is the same as that passed by the house, containing no substantial provisions whatever and simply conferring on the prison commission and the three others the empty title of "state highway department."

"Under it, so say lawyers who have closely examined it and the provisions of the act of congress, the state will not get its share of the federal appropriation for good roads, an appropriation which amounts to about \$2,000,000.

"Before passing this bill, the senate killed two substitute measures which were far more constructive. One was the substitute of Senator Persous, of the Twenty-second, which was defeated by vote of 22 to 12. The other was the substitute of Senator Stovall, of the Thirtieth, which was defeated by vote of 21 to 11."

#### A Road of Historic Memories.

Commissioner E. J. Watson, of the South Carolina Department of Agriculture, has just issued an interesting and neat illustrated booklet on the Capital to Capital Highway, which runs clear through South Carolina from the North Carolina line to the Georgia border at Augusta. It was along the route now followed by this road that Lord Cornwallis pushed the disheartened patriots and it was also in this same vicinity that Sumter, Greene and Marion kept alive the fires of hope and liberty. At Camden General Greene found his northern laurels turned to southern willows and the brave DeKalb gave his life for his adopted land and the cause of liberty. Many of the most historic buildings and relics of the old south are to be found at Camden, Cheraw, Columbia, Ninety-Six and other points in the country traversed by this road. Last winter this entire route was kept open every day for motor travel under Federal patrol system and it will probably again be the favorite route for motorists who will motor to Florida for wintering purposes. However, we are informed that the recent floods coming down out of the mountains of North Carolina played havoc with river bridges and ferries. Considerable destruction was done near Camden and there has been some delay in getting the roadway and bridge or ferry established over the river at this place. Many tourists have had to ship their autos across on freight trains and wait for a passenger train to carry them over. By detouring, however, toward Charlotte safe passage over the Catawba has been found by ferry.

With the publication of the booklet Commissioner Watson has also had prepared a fine road map of South Carolina, giving the marker system and the colors designating each highway passing through that state, with the intersecting roads.

It is conservatively estimated that ten million dollars was spent in Texas in 1915. The amount will go far beyond that during 1916, it is now thought.

# Federal Funds Spent Properly

## The "Pork Barrel" Feature Is Eliminated By Nature of the Administration

**M**OTORISTS generally are sanguine that the roads cooperation just established between the National Government and the several states will accomplish a big step toward the evolution of a Federal system of highways which will connect the different sections of the country as effectively as the French plan of national routes.

"The most refreshing feature of the Federal Aid road act is its freedom from the taint of 'pork barrel,'" comments Chairman George C. Diehl of the Good Roads Board of the American Automobile Association, which worked so persistently for the measure along with the American Association of State Highway officials.

"An automatic check is placed upon any raid on the United States Treasury," continues the road authority, "in requiring that the states must match each federal dollar with at least an equal amount. Of course, this means that the state will not squander its money for makeshift construction or repair. The law further guards against 'pork barrel' by requiring all of the cooperation to be between the state highway departments and the Secretary of Agriculture. No political official has any power over the work at all, and it is a credit to the members of Congress that they have so worded the act as to make the state the smallest unit of cooperation rather than the congressional district or the county. The federal aid road law is fundamentally as sound as any measure that could be enacted, and its only weakness, other than those of a minor character, is in its failure to require iron-clad assurance from the states that the roads will be properly maintained. Abundant and beneficent results should flow from this legislation during the next few years."

Putting this great new policy into operation involving an outlay of \$85,000,000 of government money has made of the U. S. Office of Public Roads and Rural Engineering about the busiest bureau in the government service. While the federal aid road law designates the Secretary of Agriculture as the executive officer for carrying out the act, he will very largely meet this requirement through the agency of the public roads office, of which Logan Waller Page is the director.

The first step in getting the work under way was the issuance by the Secretary of Agriculture of a formal certificate to the secretary of the treasury, the state highway departments and the governors of states, showing the exact amount which each state will receive for the first year of the law's operation. Rules and regulation for the administration of the act have been completed in tentative form, and these were discussed with state highway officials at a conference held in Washington, August 16, so all of the states might have an opportunity to set forth their position with reference to each and every point before the Secretary of Agriculture adopts and promulgates the rules and regulations in official form.

Expanding the organization to inspect and safeguard the tremendous expenditure of federal funds is a task of no small magnitude, for while the federal aid act leaves to the states the making of surveys and plans, and the actual supervision of the work, yet it requires

of the federal government very thorough inspection and approval at every stage of the work. This means that a relatively large force of engineers must be employed, and their distribution so arranged as to take care of projects in all parts of the country with the greatest possible economy of time and money, consistent with efficiency. Many appointments will be made from an examination for the position of Senior Highway Engineer that closed August 8.

"As examples of the multitude of details that must be worked out," says Mr. Page, "I might mention that we are called upon to answer hundreds of inquiries covering every phase of the operation of the new road law. We must establish an adequate accounting organization for handling the federal expenditures, and to keep track of the joint State and Federal outlays; we must expand our filing system; see that all doubtful points of law are construed by the law officers of the government, and we must work out all of the forms and procedure to expedite the cooperation between the state highway departments and the Department of Agriculture. In spite of these many vexing details and the magnitude of the undertaking, as a whole, we expect to have actual road work under way in at least a few of the states before winter sets in."

### Roads Aid Farm Development.

Farm lands in the circle of twenty miles around Lawrenceville, Va., have been increased in value by the many good roads that penetrate them. From Lawrenceville, extending out in all directions, good roads are giving this town a boost.

Lawrenceville and Brunswick county have not been doing any great amount of bragging or advertising, not half as much as they should do, but all the same the good road building that has been going on in a quiet way for two years has been a great thing for both town and county. If things go on as they have been recently, and doubtless they will, the time is near when Brunswick county will be a Virginia leader in the matter of good roads.

The real estate agents say that the good roads proposition is helping a great deal in making farm land deals, and yet Brunswick county lands, and there are none better, are selling wonderfully cheap. Many large farms are being cut up into small farms and being offered at figures that naturally attract the buyer. The sellers are not so much concerned in the prices they are able to get as they are in the matter of getting these lands settled up by intensive farmers who know how to make them bloom and blossom to their full capacity, which capacity is very great.

The Jackson Highway Association of Alabama was formed last month at Clanton, with John W. Craft, of Mobile, as president. A lively fight is on between sections of Alabama and Mississippi over the location of part of this road.

Jones county, Miss., has just started work on 30 miles of new roads. A little over \$100,000 is immediately available.

# State Aid in Road Building

By A. R. HIST

State Highway Engineer of Wisconsin

**M**OST of the states have created state road departments to give advice when requested in matters affecting road and bridge construction, or have adopted the principle of state aid or state supervision, or both, in the construction of highways. Some of these states have adopted the policy of building certain main roads at the sole expense of the state and have provided for state maintenance thereafter. In any discussion of state aid, not only for roads but for any other purpose we should not lose sight of the basic fact that money provided by any state to aid or perform any activity is produced almost wholly by direct taxes paid by the people of that state. State aid is by no means a gift of the gods acquired without the sweat of the brow.

In the Middle West, at least, the old system of local control is still enough in effect to furnish one big reason why state aid after state has independently determined that some change had to be made if roads fitting modern conditions instead of those of the Dark Ages were to be obtained. Road building is not an exact science, yet success in road construction depends upon the recognition of certain fixed principles by the builder, which principles must be observed in the construction and maintenance of all types of roads, whether they be surfaced or of natural earth. These principles are simple, and yet even today probably one-half of those in charge of road construction either do not realize them or fail to carry them into effect. In Wisconsin, if we could even get the local road builders to concede universally that a road should have two ditches instead of one, we would feel that we had accomplished a real revolution.

In addition to this general lack of realization of the basic principles of road construction, the trouble with systems of local control and local construction and maintenance has everywhere been that every piece of road was well built or well maintained there was no guarantee that the next mile would not be utterly bad and the usefulness of the good piece almost wholly lost.

Another important factor in spreading the state aid idea has been the fact that it causes incorporated cities and villages to pay a portion of the cost of rural highways, consequently reducing the cost to the rural communities to a point where they feel encouraged to take up high class construction on the most important roads. The result is that these roads are made capable of serving adequately not only the rural population but also the people of the cities and villages, who are indirectly if not directly interested in the conditions of these principal arteries through which they must draw their rural trade.

## No State Has Abandoned It.

The best evidence that state supervision and state aid are effective instruments for obtaining better roads lies in the fact that no state which has ever adopted a system of either advisory or compulsory state supervision of road work, or of state aid, or of exclusive state construction, has ever afterwards abandoned it. The original laws have been changed in almost every state; there have been changes in organization and changes in general scheme. But every state has adhered to the basic idea that if effective statewide road

construction is to be secured, it must be through state aid and supervision on the more important roads. We know of no state which has developed its main lines of travel to meet modern requirements without some system of state aid or state construction. The state most closely approaching this condition is Indiana, but it is understood that even there the system of local bond issues and consequent local construction has not been wholly satisfactory and that some other system will soon be substituted.

The first effect of state aid has invariably been to increase road construction of an adequate character. This is due to two reasons. First, under all state aid laws the cost has been distributed better than under local laws. Second, all state aid laws are so arranged that unless a county proceeds with construction, it sacrifices money to other counties which do proceed.

The second result of state aid has been better construction and the standardization of plans throughout the state, even though different types of construction are necessary in different counties, as is the case.

The third result has been the effect state aid construction has had on other construction in the state, in that the roads, culverts and bridges constructed under state plans and specifications have served as examples from which, in many cases, local construction has distinctly benefitted.

It is now practically universally conceded that any work of importance, if it is to be a success, must have a head. A state highway commission made up of high-class technical and non-technical members, with a highway engineer as executive officer, and an engineering staff trained in both the scientific and practical side of road and bridge construction, is the logical head of highway construction in any state. The principal employes of a state highway department can be engineers paid reasonable salaries, who should be, and usually are, more experienced in road and bridge design and construction than the men whom counties can afford to employ. These men deal with conditions not in one county only but in many counties, and that they are usually able to handle any road or bridge situation that may arise is not the result of chance or book education or white collars but is simply the result of state-wide experience. Having had the opportunity of seeing many pieces of many kinds of work, they have probably already encountered and helped to overcome almost every difficulty ordinarily met with in road or bridge construction.

Good roads and auto clubs, chambers of commerce and other organizations observed statewide good roads day in California on August 9, in united effort in behalf of the proposed fifteen million dollar state bond issue to complete the north and south road through California, on which eighteen million dollars has practically been expended by the state.

Bristol, Tenn., has just given \$500 to help a township build a bridge over a highway that leads to that city. \$9,000 is the amount this city has spent in that kind of work.

# Earth Roads

By H. G. SHIRLEY,

Chief of Highway Engineers of Maryland

It will be many years before the earth road will be in the minority, and in many places it will neither be economical nor will the taxable resources justify the construction of a higher type.

The earth road has often been maintained by the most ignorant men, in fact, it has not been maintained at all. It has been generally believed that it would take care of itself, requiring no work except, perhaps, the cutting away of bushes and possibly shaping with a road machine in the spring to give it better drainage to the side ditches. I know of no other type that has been so abused or has received the careless and inefficient maintenance to which the earth road has been subjected. There is no type upon which so much money is being wasted as the earth road, primarily through ignorance and neglect.

I have seen instances where a soft place existed in a hollow badly underdrained. Year after year a large amount of stone was hauled to this place and dumped on it, where it disappeared by the close of spring. Nevertheless this procedure would be steadily adhered to every successive year until the stone finally formed a compact mass. But the moisture in the earth made a mudhole at each end, and the same performance had to be repeated at each end the next year until a large quantity of stone finally displaced the mud. This is expensive road.

Earth roads should be worked in the early spring. If the roadbed is rutted, in bad condition, and flat, without the proper cross-section, it should be plowed from gutter to gutter, shaped with a road machine until it has the proper cross-section, and then kept constantly dragged until it is properly consolidated. After the road has been given this attention, then with a little constant care, it can be kept in good condition until the freezing and thawing are at hand, when it is necessary to dig it up again just as soon as the frost leaves the ground.

In maintaining earth roads we find that after the road has been properly shaped, the ditches opened, and the road given the proper cross-section, a patrolman with a split-log drag can keep from five to eight miles in good condition for at least ten months in the year. The patrolman drags the road after each rain, when the earth is in a moist and damp condition, and thus the road is kept smooth and has the proper cross-section. A description of the method of making and using such a drag can be obtained without charge from the U. S. Office of Public Roads and Rural Engineering at Washington.

When the road is dry and the surface is in good condition, the patrolman spends his time in opening up the gutters, filling any small washes that may occur in the shoulders, and if there are any spots in the road where the earth is soft and of such a nature that it will not bear the traffic, he digs it out and replaces it with good material. In places where there are wet spots, owing to the lack of proper underdrainage, the patrolman digs them out and fills them with stone or logs, making blind drains. I have found that by first putting down a layer of field stone, next placing three logs so as to form a kind of trough, and then filling in

over the logs with stone, an efficient underdrain can be made to eliminate a wet spot.

To maintain a mile of earth road properly will cost from \$40 to \$100 a year, depending largely upon the character of soil upon which the road is built as well as upon the amount and kind of traffic.

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## Convicts on West Virginia Roads.

Forty-eight counties in West Virginia employed convicts in building and repairing roads during the year ending June, 1915. The Hon. A. D. Williams, director of the State Highway Department of West Virginia has forwarded to the National Committee on Prisons pictures which show the remarkable accomplishment of these county prisoners. An honor prisoner is shown in one picture standing beside a wall that he erected in Kanawha county at a cost of only \$1.15 per cubic yard.

The pictures also show a prison camp half a mile below Kimball, with a portable jail in the centre and a prisoner driving; also prisoners opening up a new quarry and a stretch of country road two miles above Welch along the Tug river which the prisoners cut through a solid cliff.

The National Committee on Prisons has published some of the West Virginia road pictures in an illustrated pamphlet just issued. The pamphlet takes up the various phases of prison work which the committee is carrying on. The West Virginia road work is the result of legislation prepared by the National Committee on Prisons and is successful because of the coordination of the State Highway and prison departments, which the committee holds essential to the right development of convict road work.

County Engineer W. G. MacLaren of McDowell county states that "Out of the large number of prisoners in McDowell county which have been working upon the county roads only a small number have ever been in a jail a second term. Prior to working on the roads we had a number of repeaters."

When the idleness in most county jails is considered the importance of the West Virginia road work is realized, while the fact that the road-making convicts are under state control is a step towards bringing the county jails themselves under the control of the state prison authorities.

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Governor Capper has issued a proclamation calling a statewide good roads meeting for Topeka, Sept. 13, to discuss road building in Kansas and outline a comprehensive plan for road improvement. When this plan is completed, the governor proposes to wage a good roads campaign in every Kansas county in the fall to get candidates for the legislature back of the plan.

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Icard township, in Burke county, N. C., has issued \$20,000 in bonds with which to complete the Central Highway of North Carolina through that county. A maintenance system is now in effect from the coast to the Burke county line, at the foot hills of the Blue Ridge.

# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### California.

The opening gun was fired at Pacific Grove on July 22 to start the campaign for the \$15,000,000 California state highway bond issue that comes up for the vote of the people at the fall election.

At the time the original \$18,000,000 bond issue was voted in 1912, it was estimated that the cost of completing all of the trunk highways and laterals would be \$30,000,000.

The \$15,000,000 bond issue to come up at the next general election will be divided as follows: \$12,000,000 to complete the original plans, and \$3,000,000 to build eight laterals connecting the coast and valley highways from San Diego and Eureka.

1. An extension connecting the interior and coast trunk lines in northern California through Trinity and Humboldt counties by the most direct and practical route.

2. An extension connecting the San Joaquin valley trunk line at a point between the city of Merced and the city of Madera with the coast trunk line near the city of Gilroy through Pacheco Pass, by the most direct and practical route.

3. An extension of the Mariposa county state highway lateral to or near the railroad station, El Portal, in Mariposa county.

4. An extension connecting the San Joaquin valley trunk line in Tulare county with the coast trunk line in Monterey county, by the continuation of the lateral between the cities of Visalia and Hanford through Coalunga, by the most direct and practical route.

5. An extension connecting the San Joaquin valley trunk line near Bakersfield with the trunk line in San Luis Obispo county, through Cholame Pass, by the most direct and practical route.

6. An extension of the San Bernardino county state highway lateral to Barstow, in San Bernardino county, by the most direct and practical route.

7. An extension connecting Antelope valley, in the county of Los Angeles, with the city of Los Angeles, by the most direct and practical route.

8. An extension of the San Bernardino county state highway lateral to the Arizona state line near the town of Yuma, Arizona, via the cities of Brawley and El Centro in Imperial county, by the most direct and practical route.

\* \* \*

### Illinois.

Distribution has been made of the state automobile fund for 1916-1917. Nearly a million dollars was distributed to the various counties of the state by the state highway commission. The exact amount is \$990,000. This is the amount appropriated for the year 1916-17 by the last general assembly, and it was contributed by the automobilists of the state in licenses.

Inasmuch as each county must appropriate a similar amount in order to get the money the allotment means that \$2,000,000 will be spent on the roads of the state this fall and next spring, besides the thousands spent by counties which have voted bond issues.

### Louisiana.

Plans for two roads to be built at an estimated cost of approximately \$450,000, were completed by the State Highway Commission recently. A 50-mile macadam road in Polk county, extending from the Sevier county line north to the United States Forest Reserve, will soon be built at a cost of approximately \$200,000. The new gravel road in St. Francis county, to be 64 miles long, will be built in the vicinity of Forrest City at a cost of about \$250,000.

A district, comprising 42,000 acres, to build a road from Camden to the Nevada county line, near Boston, is proposed by the Public Service Bureau. The estimated cost is \$45,000, requiring a tax of 5 cents per acre for 20 years. Thomas I. Thornton and Warren T. King were appointed assessors. Farmers in the proposed district are said to be unanimously in favor of building the road. This is the first attempt in Ouachita county to build a road under the Alexander road law. The bureau also is preparing to make estimate, on a road running from the ferry near the city to a point on the Hampton road. Eighty-two farmers already have signed a petition asking that a district be formed.

The Bak-Smith Land Company, owners of Bella Vista, the resort at Cave Springs, near Bentonville, is building a mile of rock road through Bella Vista and across Sugar creek at the dam at Bella Vista lake.

\* \* \*

### Mississippi.

As the time for the pathfinding committee to go over the two proposed routes of the Jackson Military Highway from Nashville to New Orleans draws nearer, the

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proponents of the Mississippi route are speeding up construction work and attending to other details incident to the completion of the route.

The pathfinders, headed by a government road engineer, will traverse both routes, the Alabama route and the Mississippi route, and the one nearest completion and best suited for tourist travel will be officially designated. The fight between the two contending routes has been a memorable one, and as a result of the agitation a splendid sentiment for better highways has developed and the cause of good roads has received a splendid impetus in every quarter.

The highway through Lowndes county is rapidly nearing completion, every mile of the route having been provided for. Contractors have begun work on the ten mile stretch connecting the roads of the county with the Alabama section of the highway. This will be completed in the next 30 days. Bonds have been sold for a long stretch of the big highway connecting with Noxubee county and work there will begin in a short time.

Thomas J. Locke, Jr., Mississippi executive committeeman of the general association, is planning to beautify the route through this county by the planting of wild roses and willow trees on either side of the road. The plan is meeting with instant favor, and property owners along the route will co-operate in the beautification work.

The pathfinders will begin their tour the first of October, traversing both routes, and will make their report immediately after the inspection is completed. Their decision is final, carrying with it the official designation as the Jackson Military Highway. The proponents of the Mississippi route feel confident that their route will be named.

#### Contractor Uses Bad Sand.

As a result of sensational charges made on the floor of the Tallahassee Boosters' club against the contractors building the Dixie highway in Leon county, Bryson & Bryson have been made the object of an investigation by the state road department, at the instance of the county commissioners of Leon county, Fla., who asked Commissioner Wm. F. Coker, of the state road department, to look over the work being done west of Tallahassee.

At his request State Chemist R. E. Rose made an analysis and found the same to be only half sand. This has been reported officially to the state road department, which has advised the county commissioner that pure sand be used even though it will require additional expenditure. The contract with Bryson & Bryson stipulates that if it is necessary to haul sand more than a half mile that the contractors shall be paid 26.04 cents per cubic yard for every additional mile hauled. As the only sand available will have to be hauled about two miles more than a half mile, the pure sand will cost the county over fifty cents a cubic yard. About three miles of the road have been built of the half sand material, but it is stated that this can be rectified with the use of a small amount of pure sand on the road. On account of the floods the whole work will have to be gone over anyway.

Chicot county, Ark., will build a 47 mile pike through that county and leading to the Louisiana line. The cost will be about \$200,000 and gravel will probably be the material used.

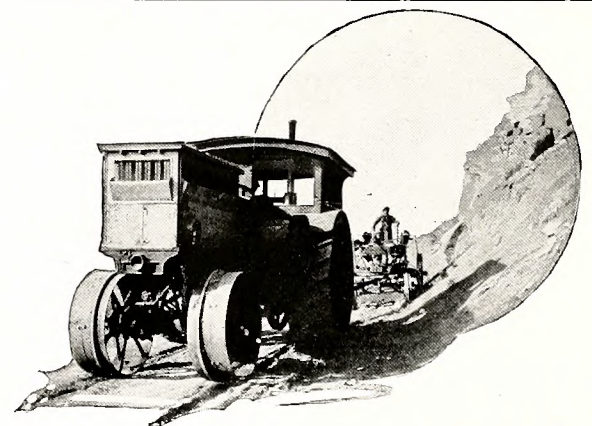
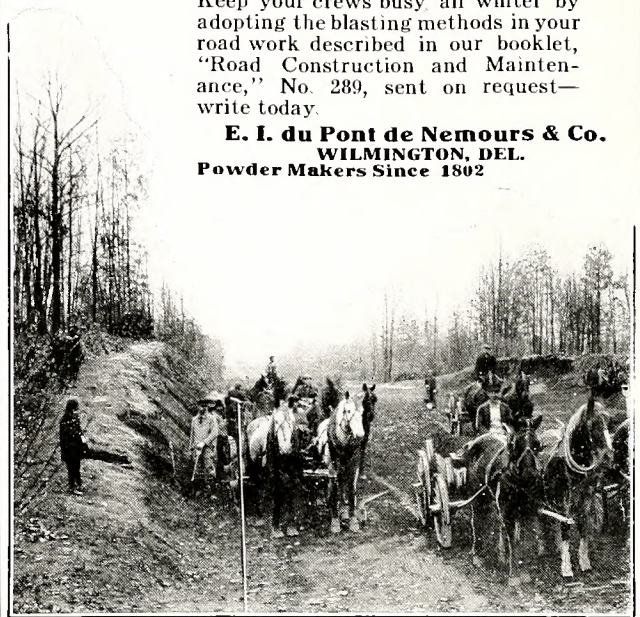
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### Hillsville Road Meeting.

A very enthusiastic good roads meeting was held at Hillsville, Va., on August 10th in the interest of a bond issue with which to construct good roads in that county. There were in the neighborhood of twenty-five hundred people who came to Hillsville on account of this meeting. The town square in front of the courthouse looked like an automobile park in one of our big cities. In actual count there were one hundred and fifty-six automobiles that had come into Hillsville from various sections of the county and from North Carolina. North Carolina was particularly interested in this meeting, inasmuch as the first road to be built, if the bond issue carries, will be a North and South road across Carroll county connecting Hillsville with Mount Airy on the South, and the Bristol-Washington Highway on the North. There is about thirty miles of this road to be built. Mount Airy is already connected at the county line with a good road, and the construction of three or four miles more, particularly in Stokes county, will connect Mount Airy and Winston-Salem with a good road. The construction of the five mile link in Forsyth will open this road to Lexington, where it joins the Central Highway. About twenty automobiles carried North Carolina delegates to this meeting, and the North Carolinians took an active part in the meeting. Everything looks favorable to the passage of a bond issue of at least \$100,000, and probably \$200,000. This will give special funds to build North and South roads, and several roads leading into it from the East and West.

The meeting was presided over by Judge David W. Bolen. Among the speakers were the following from North Carolina: Judge Spencer E. Adams, of Greensboro; S. E. Hall and P. S. Abbott of Winston-Salem; Mr. S. G. Pace, president of the Chamber of Commerce of Mount Airy; Joseph Carter, postmaster Mount Airy, and Joseph Hyde Pratt, State Geologist. Among the Virginians who made addresses were John Draper of Pulaski; W. B. Kegley of Wytheville; D. D. Tompkins, of Hillsville and Mr. Scott, Assistant Highway Commissioner of Virginia.

At the noon hour the ladies furnished a very elaborate luncheon to the visiting delegates. The Mount Airy delegation took with them the Mount Airy cornet band which took turns with the Hillsville cornet band in enlivening the occasion with good music. Winston-Salem sent twelve delegates to this meeting.

All along the route from Mount Airy to Hillsville in Carroll county school children, men and women lined the road cheering the automobiles and calling for "vote for good roads," "vote for the bonds," etc. The enthusiasm of the children was contagious, and it is believed that the county will have very little difficulty in providing the bonds necessary for the building of the roads.

### Alabama Good Roads Days.

The Alabama good roads boosters, 100,000 strong, turned out on August 14th and 15th and observed Good Roads Days. Men in all walks of life shouldered a pick or shovel, furnished a team or extra hand, and went forth to help put the roads in a good condition, which had been badly damaged by the recent floods in that state.

Alabama commenced to observe Good Roads Days five years ago. Every year this observance has been kept up until now it is a fixed event in that state. The

1915 legislature passed a bill legalizing August 14th and 15th as Good Roads Days. The success of these days is most noticeable in every way.

Alabama having taken the lead in starting the movement of Good Roads Days is now making an effort to have the twenty states that have followed her example to settle on a certain date to observe these days. It is to be hoped that such a movement will succeed. Just think of the wonderful enthusiasm and great work that could be accomplished by observing Good Roads Days throughout the nation.

Since the bond issue for roads in Henry, Tenn., failed to carry at the election August 3, the farmers along the Guthrie road north of Paris have planned to build good roads about two miles to connect up with the Murray and Guthrie roads, which are already piked. About \$1,000 has been subscribed in cash and work. The county will furnish the gravel.

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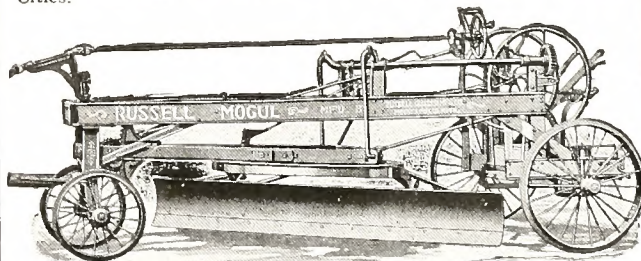
Norfolk, Va.

Lillington, N. C.

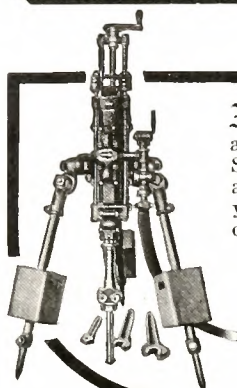
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## GOOD ROADS NOTES IN BRIEF

Wilkes county, North Carolina, will vote on the issuance of \$250,000 in bonds with which to construct sand clay roads throughout this county, which suffered heavily from recent floods. Indications are that the bonds will carry by a large majority. Ashe, another of the flood stricken counties, will likely follow suit.

The farmers of some sections of Rockingham county, North Carolina, have organized and offered free rights of way, top soil, teams and labor for building roads and the county commissioners are responding to the propositions.

Taylor county, Fla., recently voted six hundred thousand dollars for good roads. Florida counties in the past eighteen months have voted twelve million dollars for roads, which causes the Savannah News to remark that it doesn't make much difference who is elected governor of a state like that.

A new short route on the National Highway is being built between Smithfield and Roanoke Rapids, N. C.

Governor Ralston has stated that he will ask the next Indiana legislature to provide a state highway commission.

Brunswick county, N. C., has asked for bids on the improvement of nine miles more or her roads.

It is planned to make the road of twelve miles from Durham to the University of North Carolina boulevard and it is hoped to secure Federal Aid. The Durham and Raleigh road will also likely be rebuilt, probably of concrete-asphalt or some other permanent material.

The Arkansas state highway department is asking

Polk county to finance a north and south road through that county at a cost of \$233,784.

The Texas good roads convention was held August 17-18 at Medina springs, near San Antonio. The attendance was very large and many big delegations were accompanied with bands.

The Tidewater Board of Trade at a meeting at Norfolk, Va., on Aug. 25, put plans on foot for securing the construction of a highway from that city to Elizabeth City, N. C. This road would be important both to commercial and touring people.

Despite the valiant efforts of Washington and Richmond papers to arouse public sentiment and raise funds by popular subscription the highway between those cities remains in bad condition and contributions are rather discouraging. Many tourists during the past summer have found trouble in the Chopowamsic swamp. This winter it will be impossible to pass through unless the next two months see valiant work done here.

The Meridian Highway Association, having for its object the building of north and south paved highway through the West, will hold its annual convention in Wichita, Kansas, on October 5.

It is indicated that the Gadsden route for the Jackson Highway in Alabama will receive a good portion of the Federal money apportioned to that state. Counties along the line have already signified their willingness to put up their part.

The first state convicts to be worked on Bell county roads were sent from Frankfort last month. The allotment was seventy-five men, forty whites and thirty-five negroes. Several life termers were among the number. Special quarters had been prepared and the convicts were brought on a special train.

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# SOUTHERN GOOD ROADS

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## Eighth Annual Convention of the Southern Appalachian Good Roads Association

By JOSEPH HYDE PRATT

THE Good Roads Convention recently held at Lexington, Kentucky, under the auspices of the Southern Appalachian Good Roads Association, was very successful in many ways and accomplished many of the purposes for which it was held. The following states were represented by delegates at this convention: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Alabama, Tennessee, Kentucky and Mississippi. In addition to these states, there were several representatives from Ohio, New York, Michigan and District of Columbia. The association decided to enlarge its work by including in its membership the states of Florida, Mississippi, Louisiana, Texas, Arkansas and Missouri. It is planned at the next meeting, which will be held in Nashville, Tennessee, to hold a Southern Road Congress under the auspices of the Southern Appalachian Good Roads Association. At this congress will be held the annual meeting of the Southern Appalachian Good Roads Association and a meeting of the State Highway Officials of the Southern States. This will eliminate the need of a district organization of the Southern States' Highway Officials and will increase the influence of the Southern Road Congress by having the Southern State Highway Officials hold their meeting at the same time as the association.

The meetings were well attended and a great deal of interest shown in the subjects discussed. This convention brought out a very large number of the road engineers, superintendents, supervisors and foremen of Kentucky and it is believed that the convention has given a great impetus to the good road work in Kentucky.

The subjects particularly discussed were:

Federal Aid to States in Road Construction.

Maintenance of Highways.

Use of Automobile tax.

Prison Labor in Highway Construction.

Organization of Road Forces.

Main Systems of Highways (National Highways.)

The first session of the convention was held Tuesday morning September 5th in the chapel of the University of Kentucky and was opened with prayer by Dean Robert K. Massey of Christ Church Cathedral, followed by the address of welcome on behalf of the city of Lexington by City Attorney, Harry B. Miller; on behalf of the Board of Commerce of Lexington, by President J.

Clay Hunt, and on behalf of the State of Kentucky by Governor A. L. Stanley. Governor Stanley stated in his remarks that:

"Society is so organized that we must give and receive. We exchange ideas and aspirations as literally as commodities. The moral and intellectual development of the race depend upon the facility of that interchange as literally as the industrial progress of a nation upon its transportation facilities. There is no better gauge of the culture of the community, no surer index to its industrial and commercial prosperity than in the sagacity with which it determines the products which it can produce most cheaply and exchange to the greatest advantage in the markets of the world.

"The wholesome atmosphere, the seclusion and the peace of the country home in summer did not compensate for the hardships and the complete isolation of country life in winter; where families were literally marooned by their own firesides, shut off by impassable roads from communication with their kind. The general use of the automobile and the perfection of the macadamized road has revolutionized country life and given new vigor and new prosperity to the city. For after all, the prosperity of the city springs like a plant from the soil, and in Kentucky at least, it is impossible that the city should not instantly reflect the happiness and prosperity of the country."

### The Beginning of Systems.

In response to the addresses of welcome, Joseph Hyde Pratt, the President of the Association, said in part as follows:

"At the time of the organization of the Southern Appalachian Good Roads Association in 1909 there were not two counties in any of the states comprising the association that were connected with each other by good roads, thus the first work of the association was to interest the people of these states in the construction of a system of good roads in the Southern Appalachian region with connecting good roads leading down into the Piedmont and Coastal Plain regions of these states. The states of Virginia, North Carolina, South Carolina, Georgia and Tennessee, comprising the association at the beginning, entered into this work with great zeal, and results began to be obtained at once. In 1910, Maryland, West Virginia and Kentucky entered the association and in 1911 Alabama.

Now—1916, the following interstate highways are completed or well under way:

The Wilderness Road through Kentucky.  
 Knoxville-Atlanta.  
 Asheville-Murphy-Atlanta.  
 Central Highway of North Carolina.  
 Knoxville-Cumberland Gap-Cincinnati.  
 Hickory Nut Gap (Charlotte-Asheville.)  
 Bristol-Winston-Salem (Blowing Rock Highway.)  
 Memphis-Bristol-Washington.  
 Boone Way.  
 Bristol-Bluefield-Pittsburgh.  
 National Highway.  
 Jackson Highway.  
 Dixie Highway.  
 Southern National Highway.  
 Appalachian Highway.  
 Asheville, N. C.-Greenville, S. C.  
 Hendersonville, N. C.-Spartanburg, S. C.  
 Asheville, N. C.-Knoxville, Tenn.

"If this system and similar systems of highways, making collectively a National System of Highways, had been constructed, much of the anxiety and dread which the people of the entire United States had felt toward the recently threatened railroad strike would have been avoided. Such a system would save the business and the people of the country from serious consequences which might proceed from any possible suspension of railroad traffic.

"With the rapid progress made in the construction of roads, the association now has another line of work to take up and that is to bring our states into a realization of the necessity of maintaining the good roads after they have been constructed.

"Provision must be made for a maintenance fund and this fund must not be used for any other purpose. When construction work has reached such a point in a state that the available maintenance fund will not maintain any additional mileage, then construction work should cease.

Use of Automobile Tax.

Prison Labor in Highway Construction.

Organization of Road Forces.

Main Systems of Highways (National Highways.)

The subjects of Federal aid and national highways were discussed by E. W. James, chief of the division of maintenance of the United States Office of Public Roads and Rural Engineering; Francis Kiefer, assistant district forester of the United States Forest Service; Z. D. Dunlap, assistant director of the National Highways Association; J. J. Murray, secretary of Tennessee Department of Highways; Cyrus Kehr of Knoxville, Tenn.; W. S. Fallis, State Highway Engineer of North Carolina, and Rodman Wiley, commissioner of Public Works of Kentucky. As was shown by these speakers, the passage of the Federal Aid Road act emphasizes particularly the need of intercounty and interstate highways (national highways), and the state highways departments must give more consideration to the construction of main highways throughout their states. As stated by Mr. James, the main reasons for the adoption of this Federal Aid Road bill were:

#### The Reason For Federal Aid.

"First—The fact that interstate travel has increased to such an extent in recent years than an undue and improper burden has been placed on some states by reason of the traffic passing through to other states.

"Second—The necessity for constructing adequate highways for the transportation of military forces,

equipment and supplies, such highways being sometimes of small consequence to the states in which they are located, but of supreme consequence to the country as a whole.

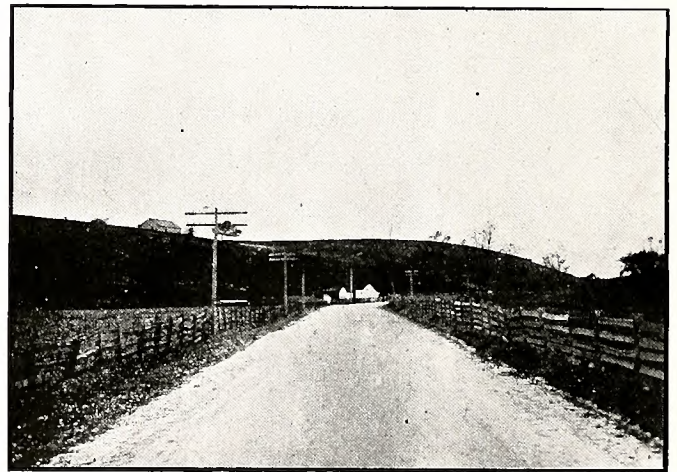
"Third—The fact that the Federal Government has resources of revenue independent of the states which justly be required to contribute to the improvement of the interstate highways.

"Fourth—The advantage to the Federal Government from a political standpoint in facilitating intercourse between the people of the different states and thus preventing sectional jealousies and prejudices which might hamper the progress and safety of the whole nation."

Mr. Kiefer referred to that portion of the bill which appropriates \$1,000,000 per year for 10 years for the construction of roads in national forest reservations, and said in part:

"In the administration of the national forests the construction of roads is constantly becoming of greater importance. Successful protection against forest fires and the full use of the various resources of the forest are dependent on roads.

"It is from the use of the resources that funds so far have been most largely responsible for the construction of roads in the national forests. So far \$4-



Flemingburg and Poplar Springs Road, Fleming County, Ky.  
 Built in 1915

500,000 has been paid to the school and road fund of states from the national forest revenues, and over \$1,000,000 has been expended from an additional 10 per cent of the revenues, but the demands have been far in excess of the funds available, and so far only a start has been made. There is urgent need for special legislation which would permit the advancement of funds for the construction of such roads by the forest service for the development of the present inaccessible resource. Such legislation has been enacted in the form of the federal aid for roads, providing for the expenditure of \$10,000,000 a year.

"It is intended that these funds be concentrated on the most important projects to secure telling results. For the year 1917 \$21,057 will be spent in the forests, which have been acquired by the government through purchase in the Southern Appalachian States and placed on the roads to be selected, applications for which must be made by October 1, 1916. The application must describe the length, location, grade, cost and need, and set forth the cooperation to be offered by the

communities, with the form of labor and the materials for the construction."

Messrs. Dmulp and Kehr spoke particularly of the need of the development of a system of national highways throughout the whole country, and showed how this bill was right in line with this.

Nearly all the speakers called attention to the section of the bill referring to the maintenance of the highways constructed by federal aid. The states must maintain the roads built if they are to participate in future federal appropriations. This is one of the best sections of the bill, and will undoubtedly lead in the end to more thorough systems of maintenance being inaugurated in the several states.

#### Discussions on Maintenance.

Maintenance of highways was discussed by A. G. Batchelder, Chairman of the Executive Committee of the American Automobile Association, who explained plans which have been worked out in a number of states for applying the automobile tax to the maintenance of roads; by E. W. James of the Office of Public Roads, who stated that he recognized that the cost of maintaining roads at their highest service varies with the locality and the type of road, but that their cost should be carefully figured and proper appropriation made for them; by Prof. C. M. Strahan, who discussed particularly the question of the maintenance of the dirt and sand-clay roads; and by A. D. Williams, state highway engineer of West Virginia, who discussed the relation between the state and county in road maintenance. Others who took part in the discussion of this subject of maintenance were W. H. Edwards of Wood-

ford county, Kentucky, and Charles D. Snead, state road engineer of Kentucky, who spoke on the maintenance of bridges.

The resolutions passed by the convention indicate very clearly the purpose of the association and the work it hopes to accomplish during the coming year. These resolutions are as follows:

"Whereas: The Southern Appalachian regions covered by the territory included in the bounds of the states comprising the Southern Appalachian Good Roads Association, abounds with scenery unsurpassed and offers fields of recreation not to be found in any other section, and

"Whereas, This rich scenery, healthful and attractive climate has not been enjoyed by the people of other sections of the country owing to the impassable condition of the roads and trails leading therein, and

"Whereas, Thousands of people that now go abroad would sojourn in this region, therefore bringing to us the benefit of a wider acquaintanceship and association and offering to the world the advantages and pleasures of the resources within this region, and

"Whereas, The purpose of this association has been and is to create enthusiasm, develop local spirit and pride and to bring about improvement in the roads so as to make possible traveling throughout all the Southern Appalachian region and to unlock unto human use and benefit the hidden treasures.

"Therefore be it resolved:

"First. That we renew our pledges and continued efforts to establish through education, agitation and legislation a complete system of roads throughout the Southern Appalachian region and that we request all



Newcastle and Eminence Road in Henry County, Kentucky

State highway officials, county officials, good roads enthusiasts, and boosters within this region and within all of the Southern States to join with us and help to bring about the desired results.

"Second. That since the last meeting of this Association Congress has passed a federal aid law and established a national system of cooperation between nation and states in the construction and maintenance of highways, therefore, we indorse the spirit manifested in the act of the federal government, and in the fairness of the rules and regulations promulgated by the Secretary of Agriculture and the Office of Public Roads, and we request that the states within the bounds of this association cooperate with the government officials in the execution of a broad and comprehensive plan so as to secure the most economical application of funds to a road system that will open up and develop the territory so as to make possible interstate communication. To this end we request that federal and state funds be applied only on roads that will develop into interstate and intercounty highways.

#### **Uniform Legislation.**

"Third. That we favor the adoption of uniform legislation throughout all of the states within the southern region providing for a state system of roads to be constructed by state, federal and local cooperation and to be maintained by and under state supervision and that a system of intercounty roads connecting the state system be established and constructed and maintained through state and county cooperation.

"Fourth. That proper maintenance of improved roads is of vast importance, therefore, we favor the establishing of the patrol system of maintenance and of the application of all automobile license tax to the maintenance of state and intercounty roads to be applied under state supervision so as to produce continuous and uniform results.

"Fifth. That we recommend that the executive committee in co-operation with the American Automobile Association and the various state highway departments, establish a uniform system of colors or emblems for the purpose of marking roads leading north and south, east and west, so as to be easily followed by persons not acquainted with the territory.

"Sixth. That we request the executive committee, in cooperation with the states and other organizations to have made a map of the Appalachian Way as established at the Bluefield meeting in 1915.

"Seventh. That we favor uniform state laws with reference to speed of automobiles and traffic ordinance and in all other manners that uniformity will produce better results.

"Eighth. That we favor and indorse the use of federal, state and county prisoners and municipal prisoners in the preparation of road and street materials and in the construction and maintenance of roads and streets, believing that such employment is not only economical for the communities, but beneficial to the prisoners.

"Ninth. That during the past year destructive floods have visited sections of the Southern Appalachian region, destroying life, property, rail and public roads, and that in these sections the problems of transportation is retarding the rehabilitation of the devastated regions; therefore, we recommend that the remaining funds appropriated for these sections by the federal government be used under proper supervision in reconstructing the destroyed public roads.

"Tenth. That we recommend a study of the various road building materials found within the states com-

prising the membership of this association and to this and we request that the legislatures of the various states appropriate sufficient funds to enable their respective highway departments to carry out such investigations.

"Eleventh. That we recommend and request that the legislatures of the various states enact a uniform statute relating to the issuance of bonds for the purpose of road improvement; that the issuing of all such bonds be placed under the supervision of the respective highway departments and that no bonds be authorized or issued for road improvement except for grading and establishing new and important roads which will later be surfaced, and that in so far as practical, all highway bonds be made payable serially.

"Twelfth. That we favor the preparation of a field handbook and text book covering the problems of the Southern states relating to highway construction, materials and maintenance.

"Thirteenth. That we urge the employment of a county engineer in each county subject to the approval of the State Highway Department.

"Fourteenth. That we thank the press of Lexington and adjoining territory for their cooperation and efforts to make the work of this meeting a success, the Phoenix Hotel for the hospitality extended, the State University, the Board of Commerce of Lexington, road officials of Fayette county, Kentucky Trotting Horse Breeders' Association and the citizens of Lexington for their hospitality."

Nashville, Tennessee, was selected as the next meeting place of the association and the officers elected for the following year are:

President—Henry R. Roberts, of Bristol, Va.-Tenn.  
Secretary-Treasurer—A. Gray Gilmer, of Bristol, Va.-Tenn.

#### **State Vice-Presidents.**

Georgia.....	T. C. Patterson, Athens
North Carolina.....	Julian S. Carr, Durham
Tennessee.....	Cyrus Kehr, Knoxville
Maryland.....	S. G. Hitchens, Baltimore
Kentucky.....	Peter Lee Atherton, Louisville
West Virginia.....	Blake Taylor, Pineville
Alabama.....	John Craft, Mobile
South Carolina.....	J. M. Jenkins, Gaffney

#### **Executive Committee.**

A. D. Williams.....	Morgantown, W. Va.
C. C. Crabb.....	Pineville, Ky.
James Maret.....	Mt. Vernon, Ky.
J. J. Murray.....	Nashville, Tenn.
W. S. Keller.....	Montgomery, Ala.
G. P. Coleman.....	Richmond, Va.
C. B. Scott.....	Richmond, Va.
C. S. Strahan.....	Athens, Ga.
H. B. Varner.....	Lexington, N. C.
W. S. Fallis.....	Raleigh, N. C.
J. H. Pratt.....	Chapel Hill, N. C.
Henry G. Shirley.....	Baltimore, Md.
M. V. Richards.....	Washington, D. C.

The recommendations of the committee were submitted to the convention.

Immediately after the adjournment of the convention, the members witnessed a very interesting motion picture demonstration of machinery showing work in the repair and reconstruction of Fayette county roads, and other Fayette county road working scenes were also shown.

In addition to the above, a resolution was passed for the Southern Appalachian Good Roads Association to affiliate with the National Highways Association.

# California's Great Highway

By MORRIS M. RATHBUN, Los Angeles

**A**LTHOUGH Southern California is generally admitted to lead the country in good roads, there is no indication of relaxing effort to obtain greater mileage of paved highways and pierce new sections with these arteries of modern enlightenment. A campaign, backed by the Chambers of Commerce and other civic organizations, is well under way to carry the \$15,000,000 bond issue for state highways that is to be voted on in November at the general election.

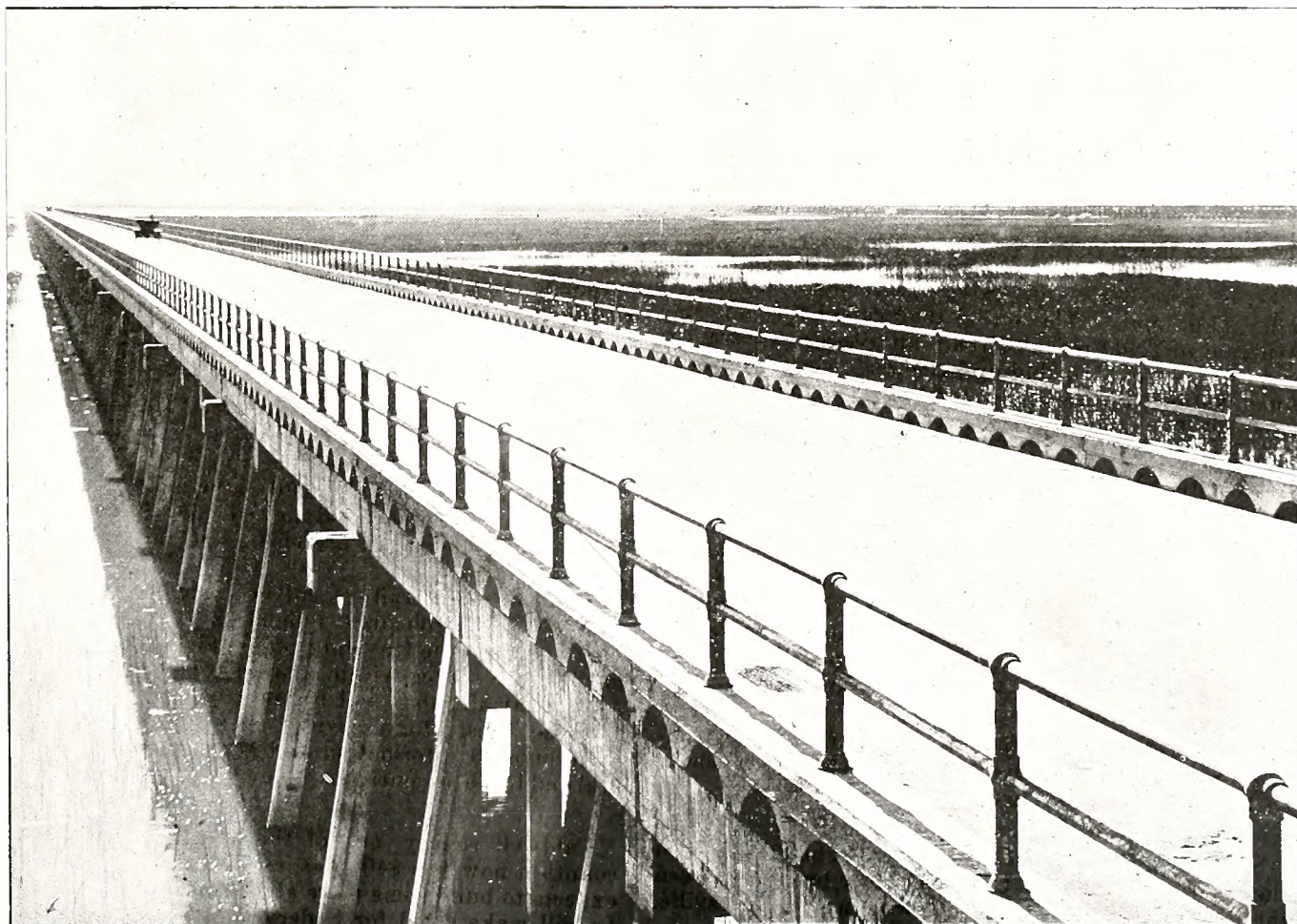
The proposed issue is largely to insure the completion of a state system of trunk roads planned years ago on which almost \$18,000,000 already has been spent. This sum was voted in 1912 and was devoted to building a paved highway through the state from the Mexican line to Oregon, on which the original estimate, with secondary branches, was \$35,000,000. It is estimated that \$12,000,000 of the proposed \$15,000,000 will be required to finish the work planned in the original estimate, allowing \$3,000,000 for new roads, most of which will be constructed in southern California.

In the report of the State Highway Commission just issued it is pointed out that the original plans may be carried out for an expenditure of \$30,000,000, or \$5,000,000 less than the estimate so that the people of California in voting \$15,000,000 additional bonds are getting more highways than they expected for \$2,000,000 less money.

The completion and extension of the state system is of particular interest to the southern part of the state, especially Los Angeles county. The new roads called for under the proposed bond issue will open up miles of the most magnificent scenery in the world. A trunk line will extend from the city direct to the great Sequoi forests, where the giant trees are said to be the oldest living things in the world. The San Bernardino trunk line will be extended to the state line near Yuma, Ariz., through the rich Imperial Valley country. If the present roads plans are carried out Los Angeles will be the hub of a system of trunk highways that will be unequaled in the world.

The county already has more than 400 miles of paved roads the quality of which was eloquently attested recently by a minister's son from the east. He admitted that he might have been violating the speed law, but pleaded for leniency on the ground that he never had seen such wonderful roads and did not realize how rapidly he was going until held up by a motorcycle officer. The present system was inaugurated with a bond issue of \$3,500,000 voted in 1908 and there never has been any spirit of niggardliness since.

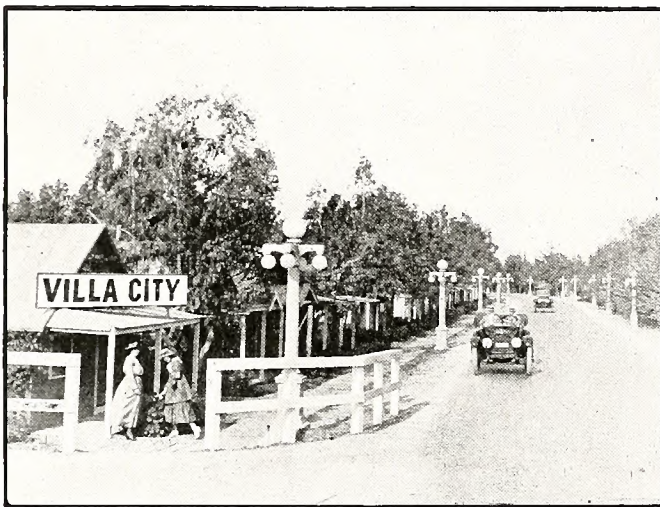
Interest in the good roads movement in this section was further stimulated recently by the government appropriation for building rural routes and opening up travel arteries in the national forests. One of the am-



Longest Highway Bridge in the World. Built of Concrete. Across Yolo Basin on California State Highway, Near Los Angeles

bitious dreams of Californians is to construct an auto road to the top of Mt. Whitney, the highest mountain in the United States. Nearly fifty miles of this would have to be built through national forest so that the disposition of the government to contribute toward road building has caused enthusiasts to look hopefully toward the Whitney proposition. California has so many acres of national forest that endless scenic routes are possible through government domain.

In addition to fulfilling their functions as traffic high roads the state highways have served to stimulate construction on the part of counties. In some sections of the state there is almost feverish activity for better roads. When one county builds a fine paved road up



The California Paved Highway Leads to the Beach Resorts  
From Los Angeles

to the line of another, stops short and allows the contrast to be so marked that every traveler must observe, pride is stung to the quick. Sometimes, as all road advocates know, it is necessary to make the people angry before they are stirred to action.

Since building of the state highways began there have been completed 1,122 miles of paved and 358 miles of graveled roads. Surveys are made for 1,400 miles additional. The act of 1909 called for the construction of 2,900 miles of road, an average allowance of \$6,200 per mile, including expenses of every nature. Some 200 miles were saved on trunk lines, 443 bridges provided by counties and 143 grade crossings were eliminated.

One interesting bit of work is the Yolo trestle, the longest concrete structure of its kind in the world. It is something over three miles in length, the westerly 2,000 feet being of timber construction for the reason that some day a levee to define the margin of the Yolo By-pass is to be built. The average height is twenty feet and it provides a clear, asphalt driveway of 21 feet in width. This trestle reduces the distance from Sacramento to San Francisco by auto to 98 miles, a saving of 38 miles by Stockton and Alhambra. The cost was \$400,000, but the basin bridged has been almost prohibitive for traffic. A big celebration marked the opening of the bridge late last spring.

State Highway Engineer W. S. Fallis has decided on the location of the new Catawba River bridge between the counties of Iredell and Catawba, near Mooresville, to replace the one swept away by the July floods.

### Building Fine Chert Roads.

Work on the pike roads in Monroe county, Tenn., is progressing rapidly. \$325,000 is to be spent in macadamizing and grading road. The Valley road from the Loudon county line to McMinn county line is being constructed out of chert, this road is sixteen feet in width and over two miles of the road has already been constructed. The cost of building the road with chert is just a little more than half of what it costs to macadamize with crushed limestone, and it is believed that the chert road will last longer and give better satisfaction than if built with crushed limestone. This county is very fortunate in having large deposits of chert beds conveniently located for road use, and it is now likely that the county will get more roads on the last bond issue than was expected at the time the bonds were voted because of the decrease in the anticipated cost of construction owing to the use of chert instead of crushed limestone.

A second crew is working on the road between Madisonville and Sweetwater. This road is being constructed out of limestone, and it will be only a short time until the distance between Sweetwater and Madisonville, the county seat, will be reduced to twenty minutes. It used to take two hours to make this trip in bad weather.

### Instructions to Patrolmen.

Mr. D. H. Winslow, U. S. Supt. of Construction, with headquarters at Durham, N. C., sends Southern Good Roads a copy of the instructions furnished each patrolman, together with report blanks prepared in such manner as to easily check up all defects, and another report of work done. The instructions follow:

Inspect your road, its entire section during a rainy day and locate all pond holes.

Use the road drag immediately after a rain.

Fill all depressions with good material.

On no account use worn out material, sod or sand from ditches.

Remove all glass, tin cans, nails, old iron, etc., from the road bed.

Renew all defective plank at culverts when necessary.

Should your road surface be very rough, a spike toothed harrow used while the road is wet will improve an earth, sand-clay, top soil or gravel surface.

Cut the weeds both sides of the road. Use a mowing machine for this purpose if practical.

Cut all brush at inside of the curves and at railway crossings and culverts.

Remove the ridge between the wheel rut and the gutter by using the one-horse cultivator and then use the drag to push the material toward the ditch.

See that all culverts are clear, with outlets and inlets in good order.

Paint all guard rails at culverts and bridges, etc.

Renew all signboards, mile-posts, etc., when necessary and give the traveling public all the advice in regard to the routes within your power.

See that all labor and teams in your employ render full and satisfactory service.

Receive all information and criticism from the general public in a courteous manner.

Caldwell county, one of the smallest of the Texas counties, now has \$400,000 invested in new roads and expects to build some more at an early date. The county will make a bid for Federal aid.

# The Cost of a Road

By ROBERT IRMES

**An Address Delivered Before the Southern Appalachian Good Roads Convention in Its Recent Session at Lexington, Ky.**

**I**N SPITE of the fact that many hundreds of miles of improved road have been constructed in the state of Kentucky, I venture to assume that no inquiry has been made into the real cost of a single mile constructed.

In this paper I intend to take up and discuss the cost of a mile of road, so that some idea may be had as to what it means when a community expends a part of its tax levy or a part of the proceeds of a bond issue in constructing a mile of road. Probably no two miles of highway ever built cost exactly the same figure, because no two sets of conditions surrounding such construction have ever been the same. We can, however, consider several different types of road and assume fair and representative cost figures. The reason for this discussion is not so much to establish either an ideal figure or even a practical and actual figure for the cost of a mile, but to indicate the real elements of such cost, and point out just what this cost when stated in dollars and cents can be used for. Once we have established the factors that compose this cost it will be comparatively a simple matter to ascertain the cost of any particular mile.

At first thought the cost of a road appears as plain a matter as the cost of any commodity that we might choose to buy.

Consider, for instance, a piece of ribbon. It is long and narrow and not very thick (in those respects just like a road), and it may be considered as representative of the simplest commodities that we purchase for daily use. When one buys a piece of ribbon, it is with no other idea than securing such a fabric as satisfies. It might be of a certain shade, width and quality perhaps if these requirements are met, then nothing more is asked. As between two entirely satisfactory materials, the one having the lower cost per yard will be taken. The ribbon is purchased to be used up, to be worn out. The procedure involves nothing complicated. The cost of the ribbon is so much a yard.

If we now consider the cost of a road as compared with the cost of a ribbon, we find certain very essential differences. To be sure, both have a first cost. Both are purchased at so much for certain unit quantity. The ribbon is bought already made; the road is bought built in place. So far the idea of cost is the same in each case.

## There Are No Permanent Roads

If we stop to analyze the cost of a road, however, we shall find that this first cost per mile is not the only element in the cost, and we shall further find that it is often not the most important element. The ribbon is put to its intended use with the expectation that it will wear out within a certain time. The road is put to its normal use. Often it is with the hope and sometimes with the expectation that it will not wear out. How often we hear the expression: permanent road. Of course, there is no such thing. The road begins to wear out the day it is opened to traffic.

If we shift our comparison now from a bit of ribbon to a house, we can easily see how another element enters into the cost.

Without going into economic or theoretical subtilities we may consider that the first cost of both the road and the house represent the value of each as of that time. Further, in connection with the house, this first cost continues the basis for estimating the value at any future time. The structure may be improved by additions or betterments, or it may deteriorate; and in either event an appropriate alteration can be made in the value. And this value is expressed in dollars and cents in case a sale is contemplated for assessment purposes. Under these circumstances, the cost of the house remains essentially its first cost with additions or subtractions of exactly the same nature as the first cost.

Considering a road on the other hand, we find that after the first cost establishes the value as of that time, it never becomes necessary to restate it with the necessary adjustments as in the case of the house, because the road is never offered for sale.

## Cost a Different Element.

We are no longer concerned with the first cost alone, as applied to a road. It is not a figure we find useful or essential when used alone. To be sure it expresses a fact. It tells what the community paid for the road. But it does not express what the community could ever get out of the road on any practicable assumptions whatsoever. If we use a term like the cost of a road, then, either we have in mind an idea altogether different from the first cost or we have practically a useless idea in mind.

In the case of the house we find that from time to time certain repairs are necessary. These are made. But they do not add to the value of the house. The actual condition may be such that the value after painting and repairing is still less than first cost. These charges for repair are properly carried as a rental. Similarly, interest on the investment represented by the house is considered to be a part of the annual rental.

Now if we introduce these same elements into road matters, we find that in addition to the first cost we have certain annual costs just as with a house. There is interest; there is annual repair and maintenance. So we find that the cost of the road is not only what the community paid for it per mile at the time they bought it, but other elements must be involved.

This must be the case, if we attempt to arrive at a useful expression for the cost of a road. It becomes no longer necessary to carry a value that can be expressed at will in dollars and cents for purposes of sale. Such contingency never arises. There are then two elements that enter into the cost of a road that make it different in aspect from the cost of a house or other commodity. One is the fact that the road is a permanent investment. No county expects to get its money out of the investment by selling. It becomes fixed capital of a peculiar kind. A county can not pick its roads up and sell them. It can not sell them in place. Neither can it ordinarily use them so as to obtain a cash income from them, or any form of cash re-

turn. If the roads go to pieces, it is an absolute loss of fixed capital, unrecoverable in any way.

#### Roads Constantly Wear.

Again, a road is a perishable structure. It is exposed to all sorts and conditions of weather and is subjected to heavy and rough treatment in its normal use. The result is a constant and often rapid wear and deterioration. To meet this, we must be prepared to do such work as may become necessary at a variable charge. In other words, the possession of a road involves a community in an annual charge, or else subjects it to a loss of fixed capital in part or in whole.

In consideration of these two usual elements affecting the cost of a road, we are forced to give a new definition of the cost. When all things are weighed, the item that we must have when we wish to compare two roads is not the first cost, but the current cost, the annual cost. The first cost is permanently involved in the road, it never can be got out again and can only express the cost to the community in any useful sense when, at the end of a period of years, it is entirely lost through lack of care or thoughtless indifference.

The current or annual cost of a road involves generally two things. The first is interest on the permanent investment. The second is an annual charge to keep the fixed capital represented by the road in an undiminished condition.

The best way to describe the matter is to assume a case.

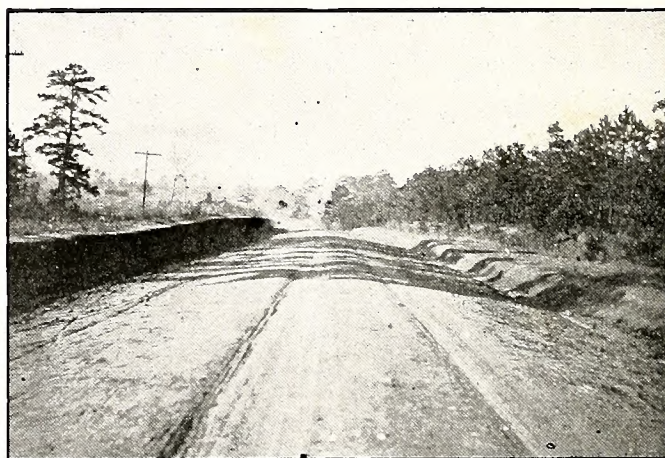
#### Cases in Illustration.

Let us take a county that issues bonds for \$100,000 at 6 per cent, sells the bonds so as to realize par value after all validating and underwriting expenses are met. Assume that 20 miles of road are built and that some one mile costs the average price of \$5000. We find that about 60 per cent of the first cost of a road is represented by the surfacing. This is the part subjected to wear, and on our assumption would represent \$3,000. The type of our assumed road and the traffic it is called upon to carry are such that if we did not spend a cent on repairing the surface, it would be entirely gone in 10 years. Assume that the local officials are so short-sighted that they let the road wear out. What is the real cost of that road? How shall we best express it? The statement of cost is simple and obvious. \$180 per year represents the interest per year on the surface charge; \$300 represents the annual loss of fixed capital. Total, \$480 a year for 10 years, and the community has \$2,000 left in embankments and culverts to show for an investment of \$5,000. The community has spent \$1,800 and lost \$3,000 of its fixed capital in ten years. It has no surface left on its road. The cost of such a road is \$480 a year and the surface is getting worse every year, so that during the last five years it is worse than no improved road at all for some types of traffic.

Let us review another case actually found near Lynchburg, Virginia. A couple of years ago I had occasion to inspect some waterbound macadam. The community did not know quite what to do. They had built a considerable mileage of limestone macadam about three or four years before and found it, in spite of all they could do, in very dilapidated condition. I went over the matter and found that the county was expending about \$150 per mile each year on the road and that the existing condition of the surface was nevertheless becoming generally worse. It was found that on the main road it was necessary to resurface the entire mileage, to renew the wearing course of stone.

The road in question was about 3 years old and had cost \$2,500 per mile to surface. To replace the top course would cost \$1,650. The total annual cost of that road was interest \$150, ordinary repair \$150, periodical repair \$550, or a total of \$850 per year. Because the good officials of that county had not considered what the real cost of a road is, they found that they were loaded with an annual charge that they could not meet without large additional direct taxes, and their only alternative was to lose the investment they had made, or to lose their fixed capital by simple deterioration.

There is another interesting case taken from inspection reports of field men of the Office of Public Roads. In 1913 there was a marl road in a southern county that had been built at a moderate cost and was considered by the county commissioners as a cheap road. It was one of a few good roads in the county and attracted a great deal of traffic. The engineer reported



What Neglect Will Do For a Sand Clay Road. Photo Taken in a North Carolina County

that the road was costing from \$1200 to \$1,500 a year to maintain. Still another extreme case came under my own observation recently in a shell road. Owing to lack of proper records it was impossible to secure exact data, but accepting the statements of the road authorities the conditions were as follows.

A shell road was built about 4½ years before the inspection. The compacted shell was laid 7 inches thick, and cost about \$5,000 to build. I bored through the road and found 1 5-8 inches of compacted shell on an average for several miles. A simple computation shows that this shell road is costing \$300 a mile in interest and about \$850 per year in deterioration, or a total of \$1,150 per year. A gentleman I met in the county protested that the road was not costing the county a cent, because the county had not spent anything on it each year.

#### Annual Cost What Counts.

It would be possible to enumerate a considerable list of similar cases; but it is not necessary. The fact must be clear that the cost of a road that is significant, that means something is the annual cost. This has not been clear in the past, indeed is not clear to many officials. I recently discovered a Texas county that is raising the maximum road revenue possible under the state law. The annual income was about \$43,000 in 1915. The fixed charges such as interest on bonds and warrants and sinking fund on the warrants amount to \$35,000. This county has about 100 miles of im-

proved road and there are only \$8,000 available to meet the annual charges for repair and maintenance. Obviously this county went ahead with their road improvements without a full knowledge of the real cost of the roads they were building.

Some of these figures may appear high to you and the question naturally arises in your minds. Will our people ever build any more roads if the cost is presented to them in this light? Before attempting to answer the question, I might give you some more figures briefly, indicating the cost of roads in Massachusetts. The cost of annual maintenance there is above \$500 per mile per year. The roads cost about \$10,000 to build, so that at 6 per cent the annual cost is about \$1,100. In Maryland the roads of the state system cost about \$10,600 per mile to the end of 1913 and the average annual maintenance charge that year was \$434, a total of \$1,070 a year.

If this is the real cost of a road, how are we to justify it? Because it certainly will require justification before some of our citizens.

Obviously we must consider what return we get from the road. It has already been pointed out that we cannot look for a cash return in the ordinary case, so we are limited to a consideration of the traffic a road bears, to the development it makes possible, to the pleasure it gives.

#### What is Our Pleasure Worth.

I do not recall that I have ever heard any speaker on the subject of road improvement frankly point to the pleasure of using a good roads as any part of the return for the rather large cost of a road as I have indicated it. But there are excellent reasons for including this pleasure as a part of the return for which we pay. Almost every group of our population pays willingly for some pleasure, and usually pays a good big price. It is not necessary to turn this talk into a temperance lecture, but I should like to point out that that group of our population who enjoy drinking spirituous and malt liquors were willing to pay about \$2,500,000,000, for the pleasure during 1915. Those who enjoy smoking paid about \$800,000,000 for the pleasure of an occasional cigar. Those who attend the "movies" spent \$450,000,000 in catering to their dramatic pleasures. Those who travel abroad have spent millions annually on the pleasure of traveling; those who drink soda water spent \$200,000,000; those who eat candy spent \$300,000,000, and the users of chewing gum spent \$50,000,000. Leaving out Colorado, Michigan and Arizona, the auto registration in 1915 was \$2,210,256 and the annual revenue is \$15,557,000. These pleasures are ubiquitous; they apply in some measure to almost every imaginable group of our population. The farmer may criticise the automobile owner, but the farmer is too willing to pay for his pleasure. I was boarding at a farm house in South Carolina several years ago. The farmer had the name of being a good provider. He was and I lived well. One day he came back from town with a small square box and sat down on the front porch to open it. He said as he pried away with his clasp knife that while driving home he had figured that he had spent about \$500 for chewing gum tobacco since he began to chew. That represented his pleasure. He was, I suppose, from 50 to 55 years old and had owned a farm for half his life. If he had paid as much for road taxes it would have been \$20 per year average for the whole period.

So I think it is conservative to assume that the average man is willing to pay something for the fun of

it. I am not alone in this opinion for New Hampshire, California, Colorado and Maine have spent hundreds of thousands of dollars building roads for tourists. They believe that people will pay for the fun of using the roads. Switzerland and parts of Italy are maintained by the tourists who pay practically the whole bill. The officials of those countries agree with me that people will pay for the fun of it.

Some part of our road cost large or small, varying with each user's tastes and capacity to enjoy, may fairly be written off on account of pleasure. The road has a real value from this aspect just as much as a distillery has, or a tobacco factory or a moving picture theatre or the Alps, or Lake Como or the Rhine.

#### Power to Direct Development.

The return from a good road may also flow from the power the road has to direct development. If you doubt that road improvement or street improvement both directs and quickens growth, just ask a few real estate operators what they think about it. The first thing done in a subdivision is to open streets or roads and lay sidewalks. If these things are not done, then the subdivision is likely to remain nothing but a row of stakes.

The proportion of development power that may exist in a road varies between wide limits, of course. An improved road in Florida, built out through the pine woods or palmettos without a house insight for a mile at a time, has a very different aspect as a factor in the development of the region from a road improved in a settlement already filled with homes and under cultivation.

But after all, these factors are small compared with the actual saving in transportation affected by an improved highway. We have shown annual costs ranging from \$500 to \$1,000. These appear large, yet they are not so large but they can be fairly met by the saving in cost of hauling.

Dr. L. L. Hewes of the Office of Public Roads and Rural Engineering, has made some interesting investigations of the cost of hauling farm products. In seven counties he found the average cost of hauling one ton a mile on improved roads, sand, loam or clay, was 29.1 cents. The cost varied from 16 to 37 cents a ton-mile. He also found that the cost of hauling on a system of improved roads varied from 2 to 10 cents less than on unimproved roads. If we consider the average reduction as 5 cents a ton-mile, then 33 tons a day will provide \$300 a year and 66 tons a day will provide \$1,000 a year in savings on the cost of hauling. If we calculate this way we get the pleasure and development values of our roads for nothing.

The annual cost of a road, the real essential cost of a road should be considered always as a rental for the use of the road, and it should be investigated in advance by every community contemplating road improvement. When the amount of the rental is established, then it will be an easy matter to decide whether the community is assuming a fixed charge that they can carry, and whether the return in the reduced cost of travel, in the power to develop, and in the pleasure of using the road is worth the price.

This way of looking at the cost of a road and of offsetting that cost by certain more or less definite benefits received, enables us to handle intelligently another matter of very great importance.

#### Maintenance Changes Figures.

In the first part of this paper we made an assumption

of certain data to arrive at the real cost of a road. We found that cost to be \$480 if we allowed the road to deteriorate to the point where it would have to be rebuilt. If, on the other hand, we do not permit the road to become rough and unserviceable at any time, but keep it constantly in good repair, we must change our figures somewhat. We assumed that our road would wear out in ten years, and that the annual loss through depreciation would be \$300. If now we consider the actual annual deterioration, we shall find that the wear during the first year will not be nearly so great as during the last year. The average wear will, of course, be 1-10; but in such a road as we have taken, it is safe to assume that the wear in the first year will be equal to one-twentieth (1-20) of the construction cost and not one-tenth (1-10), and that the amount of deterioration will be represented by \$150. Of this wear we can replace about 2-3 annually by a system of efficient maintenance, and the 1-3 remaining can be placed at the end of five years. The cost of replacing it will be about 30% of the original cost. Our annual charges then become \$180 interest, \$100 annual maintenance, and at the end of five years we spend \$900 to replace accumulated deterioration that we have not been able to replace annually. If we distribute this charge back over the interval of five years, it amounts to \$180 per year, and the total annual charge of the road is \$460 per year, and at the end of the five year period our road is as good as new. Annual wear and accumulated wear have both been accounted for in the charges we have made, and there has been no loss whatever of fixed capital. If this procedure is continued during a second five year period, we would still have our road. Furthermore, the road would be continuously in good condition. There would be no period when we would begin to travel a road half worn out, and becoming worse each year.

#### Is Maintenance Cheaper?

The difference in the cost of these two methods of handling the road situation is only \$20 per mile per year. The assumptions were so made that the difference would be small and at the same time entirely reasonable. The question naturally arises: Why not let our roads go and rebuild them when they are gone? If our figures are correct, it only costs \$20 per mile per year to do this, and it saves us a tremendous amount of trouble. If we have distributed in ten years the proceeds of a 30 year bond issue, it makes no difference if our roads wear out before the bonds are retired. We have accounted for the entire charge, and find we cannot save enough to make it pay to maintain regularly. If a man can take the actual figures and show that it is more economical to let his house run down, let the underpinning rot, let the jointing wash out of the masonry, let the paint crack and peel, let the foundation settle and the roof sag, let the flashing rust away and the shingles rot; and then at one big overhauling put the whole into first class condition again—if it is more economical to do this than to repair as you go, why not do it? If this same policy in road management is much less trouble and only \$20 more costly per mile, why not follow it? It is a policy that fits our county governmental organization. None of us know anything about the other method, and this policy of letting the roads go is the easiest for us.

This sounds well; perhaps, but it will not stand investigation. For I have shown you that the annual cost, the real cost, of a road is going to be high in any case. To warrant this high cost there were certain

returns. We calculated that we could get our money's worth of pleasure, development and cheapened transportation. If we let the roads wear out, then during the last five years of the ten they were worse often than no road, and so we lose fifty per cent of our pleasure. If the roads wear out, we lose a large percentage of the power of development; the whole lay-out looks rundown, unkept and out of order. Unless our road surfaces are kept smooth and intact the five cents per ton mile that we count on saving is not saved. We do not have the advantage of cheapened transportation. In these days we lose a large part of the return for our road expenditures.

The matter appears to have come to a natural conclusion. Our main improved roads are going to cost us under the most favorable conditions a considerable sum annually per mile—from \$200 to \$1,000. To get adequate return for this large rental the road must be kept in condition to render maximum service at all times. This means continuous maintenance, repairs of all kinds intelligently made when needed, careful financing and good business management, skilled supervision and engineering services.

Under any other condition we face a serious loss; a loss of fixed capital, a loss of community wealth that must be written off against the economic resources of the county or the state.

#### Oil on Macadam Pikes.

Davidson county, Tenn., in the course of another year will have roads that will surpass any in the state is the statement of S. G. Marshall, superintendent of road construction of that county.

The Dickerson pike is now nearing completion and will be as smooth as a sidewalk from Nashville to the county line.

The following other pikes will receive the same treatment as the Dickerson as soon as the authorities can get to them: Hillsboro, Hardin, White's Creek, Lebanon and Gallatin. Each will be macadamized to the county line.

The work of constructing a road of this nature is very interesting, there being many important features that have to be scrupulously attended to. First the pike must be absolutely free from dust before the heavy oil is spread. Every hole of any size must be filled. Sand must be quickly applied as soon as the oil is placed on the road, and then the road roller must lose no time in packing this material down before the oil has a chance to cool or harden.

The county has a large truck holding 1,000 gallons of oil. When the oil has reached the necessary temperature, heated by two gasoline jets in the rear of the truck, it distributes the oil through funnels similar to a wheat drill, and in this way it makes its distribution even. The oil is so heavy that when it takes the ground, whether on a hill or not, it does not run. It takes about 6,000 gallons to the mile. The cost of oiling a macadam road is estimated at about \$1.300 per mile, and under some conditions more.

For over seven miles on the Dickerson pike the road has been completed, and has proved such a success that Mr. Marshall is having a good deal of trouble in keeping travelers off while work is in progress. On a recent Sunday the road was thoroughly tested by over 600 cars. Although a new road and yet soft in some places, the heavy cars made no impression on the macadam.

The life of these roads is estimated at three years and longer with good care taken of them.

# Wilmington-Goldsboro Highway

Inaugurated at Good Roads Meeting at Warsaw, N. C., Sept. 20, 1916

By JOSEPH HYDE PRATT

**B**ETWEEN 600 and 1,000 good roads enthusiasts from New Hanover, Pender, Duplin, Wayne and Sampson counties, gathered at Warsaw, Duplin county, on Wednesday, September 20th, 1916, to devise ways and means for the construction of the Wilmington-Goldsboro Highway. Probably never has a more enthusiastic road meeting been held in this state, and this enthusiasm will undoubtedly be rewarded by the construction of this highway. Nearly all of the New Hanover and Wayne county delegates came in automobiles and in the automobile parade that preceded the meeting there were nearly 100 machines, each of which carried a banner calling attention to the need of the highway and the value of good roads. Ten automobiles came through from New Hanover county and other machines brought delegates from Goldsboro, Mount Olive, Faison, Clinton and Burgaw. The parade ended at the High School building, and the good roads meeting was called to order in the auditorium of the school by the Chairman, Mr. C. B. Middleton of Warsaw. The invocation was made by the Reverend R. H. Herring, and a very cordial welcome was extended to the members of the meeting by Reverend A. O. Moore of Warsaw. The response to this address of welcome was made by Mr. Z. W. Whitehead of Wilmington who, in very appropriate words, expressed the delight of the delegates at being at Warsaw, a city that could give as warm a welcome as any in the state.

Joseph Hyde Pratt, Secretary of the State Highway Commission, was then introduced by Senator R. D. Johnson, to whose efforts much of the success of the meeting was due. The subject of Mr. Pratt's address was "Benefits of the Wilmington-Goldsboro Highway, and how to build it. He stated that this highway would become a link in a great National Highway and would be one of the more important highways in the state. He showed the many beneficial results that the counties would derive from the construction of this highway and suggested a plan of organization which, it is believed, will result in the construction of the highway. He also called attention to the need of maintenance of roads, and stated that unless the people would make provision for maintaining the highway, they ought not to construct it.

The next address was made by the Honorable George E. Hood of Goldsboro, who spoke on the subject of "Federal Aid for Good Roads." He maintained that more wholesome legislation was being enacted for the benefit of the rural districts than ever before and that this was necessary to prevent the cities from suffering on account of lack of adequate supplies being furnished by the country.

Mr. W. A. McGirt, of Wilmington, made a short talk, praising the roads around Wilmington, and saying he hoped to be a still closer neighbor to Duplin by reason of the better roads. He was followed by Mr. John Peterson, of Sampson, who spoke of the new road being built through that county, which would enable him to go to Wilmington after breakfast, spend several hours, and return in time for supper.

Mr. George Galvin, of the Wilmington Rotary Club, was the last speaker, and he said there would be no

obstacles to building the highway, as far as Wilmington was concerned.

Chairman Middleton then appointed a committee to formulate plans for securing the highway, as follows: Edward Farrier, for Pender; Thomas O'Berry for Wayne; W. A. McGirt for New Hanover; W. L. Hill for Duplin.

At the close of the morning session the delegates were all bountifully served at an old time barbecue, which was enjoyed by all.

At the afternoon session the committee appointed by the Chairman at the morning session made its report, suggesting that the convention organize itself into a permanent association to be known as the Wilmington-Goldsboro Highway Association and that an executive committee comprising three members from each county, a President, Vice President, Secretary and Treasurer, and Chairman of the Executive Committee be elected. The convention then elected the following officers and committees of the Wilmington-Goldsboro Highway Association:

R. D. Johnson, Warsaw, President,  
W. A. Brown, Rocky Mount, Vice-President,  
Z. W. Whitehead, Wilmington, Chairman.  
Thomas O'Berry, Secretary-Treasurer,  
Robert O'Berry, Charles Dewey, M. F. Breazcale, Wayne;

J. T. Albritton, P. J. Heath, George R. Ward, Duplin;  
George Powers, H. P. Woodson, A. K. Parsons, Pender;

W. A. McGirt, H. P. Galvin, Paul B. Bell, New Hanover.

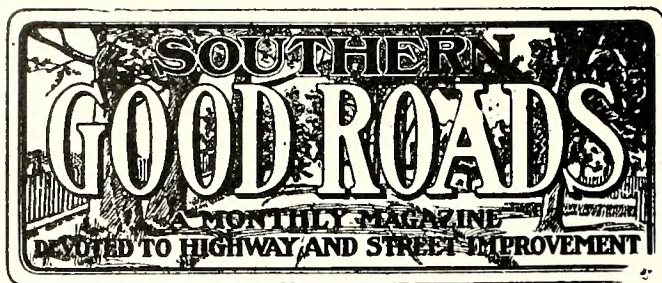
A committee of eighteen was appointed to solicit members in the several communities along the proposed route. These are: Badger Bowden, Dudley; Fred Mintz, Mount Olive; J. R. Maxwell, Calypso; M. McD. Williams, Faison; A. R. Turnbull, Bowden; J. A. Powell, Warsaw; W. R. Newberry, Magnolia; Oscar Fussell, Rose Hill; H. D. McMillan, Teachey's; John B. Boney, Wallace; James Johnson, Willard; James Blake, Watha; W. M. Hand, Burgaw; Howard Pedin, Rocky Point; A. A. Ran, Castle Haynes; J. O. Bryan, Wilmington; Joe Parker, Goldsboro.

## "Run" on Jefferson Highway.

A relay "sociability" run is being planned by the officials of the Jefferson highway, to extend south from St. Joseph, Mo., to New Orleans, La., patterned after the wonderfully successful run of the same kind made recently, extending north from St. Joseph to Winnipeg, Canada, the northern terminus of the highway. This run will pass through Carthage, Mo., home of Manager J. D. Clarkson, and a big meeting is expected to be held there.

This run will not be undertaken until after the fall elections of November 7 have been disposed of, so that there will be no distractions.

Extensive preparations are being made for this run at many points along the route with the determination that this southern run shall be just as successful as the big northern one.



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F. H. HYATT, President, Columbia, S. C.  
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**DIM YOUR AUTO LIGHTS.**

With the advance of the times new problems arise that a few years behind would have been considered as mere trifles. For instance take the matter of automobile headlights on the public highways at night. The modern automobile light casts a glare as blinding as a locomotive, so much so that it is liable to confuse a person meeting it. On our modern highways there are hundreds of motor cars at night, and the light problem has become serious. Thousands of wrecks have probably occurred on the highways of the nation this year because of confusion caused by bright headlights. One way to handle the matter is courtesy, but it is impossible to secure uniform courtesy, even among auto owners. A great majority of them will observe the rules of courtesy when not forgetful. This is confirmed by the recent experience of a motorist who went on an asphalt highway at night for fifteen miles without dimming his lights. Not a single car passed dimmed theirs. He made another trip and dimmed his lights on meeting each car, and two thirds of the drivers met responded. But what are you going to do about the other third? Legislation ought to be passed in every state, requiring that lights be dimmed when meeting another car. Laws of this character must always be passed for the restraint of the minority. Neglect of this matter has cost a goodly number of lives. See

to it that your legislature has the matter called seriously to its attention this winter.

**SHALL WE HAVE SIGNBOARDS?**

This winter most of the state legislatures will again be in session, and already the friends of roads, the folks who travel them—which now includes just about everybody—should begin to consider what legislation they will urge. For a good many years lots of us have been talking about signboards, but we haven't got the results. Quite a few sections of some of our great inter-sectional highways are appropriately marked with signs, but the overwhelming majority of our public roads are probably not as well marked as they were a number of years ago, before the coming of railroads into nearly every community. Then it was necessary to make long commercial trips over the highways and marking was necessary. Then came the railroads and the signboards went down. But the automobile has revived this very urgent subject. It is a very proper question for the legislatures of the states for the reason that all the counties, acting separately and voluntarily, will not provide proper signs. It should be made compulsory upon all county commissioners that the roads in their counties be properly marked and at the county lines the direction to the next chief point in the adjoining county should be indicated. The cost would be small and the convenience great. Most of the commercial salesmen of today are using automobiles, so signboards have come back in commercial importance.

**Soldiers Make Roads in Mexico.**

Building and maintaining good roads is not only a problem of peaceful times, but one of war as well. In modern warfare, when military success is largely dependent on how quickly and easily troops may be transported from place to place, the construction of roads becomes a vital factor in the daily life of an army either defending or advancing its position.

Down in Mexico during these many months Uncle Sam has been demonstrating his skill as an emergency road-builder. In and around Columbus, N. M., and for a considerable distance across the border he has worked wonders with the roads over which supplies and munitions must be carried to his grim, determined boys in khaki.

Between advanced types of road-building machinery and the use of motor trucks, the soldier-workers have been able to transform many miles of rough, rutty Texan and Mexican highway. A fleet of small scrapers and a number of big side-conveyor type of graders have been kept busy ever since Gen. Pershing's punitive expedition swept across the international line.

The Lincoln Highway now contains markers over a total of 3,333 miles at the end of its third year's existence.

The state of Illinois leads all the states of the Union in the amount of concrete roads contracted for during 1916. Ohio is second and Indiana third.

# Report of Construction Progress in Southern Appalachians

By HENRY ROBERTS, Chairman

Delivered Before Convention of Southern Appalachian Good Roads Association  
Assembled at Lexington, Kentucky

THE past year has witnessed a great drive forward all along the lines of improved road construction in the Southern Appalachians. Districts, Townships, Counties and States, and even the National Government, have taken advanced ground, with every prospect of closing the unfinished gaps and completing a great system of local and interstate highways within the next two or three years.

While the unprecedented rains have retarded construction work during the past summer, much progress has been made towards the completion of local and through highways throughout this territory; enormous funds have been provided for future construction; plans have been made, and large contracts have been let for the completion of many important sections of through highways as well as local road systems.

To those who know in a general way of the rolling and even mountainous character of this section, with its fertile valleys and hills and wooded mountain sides under which lie hidden the greatest mineral resources in America, but who do not know of the history and character of the people, largely of native stock, of the Southern Appalachians, the figures representing bonds voted for road improvement are simply staggering!

During the past ten years Districts, Townships and Counties in Western North Carolina, East Tennessee, Southwest Virginia, Eastern Kentucky and in West Virginia, embracing a territory about 200 miles wide by 600 miles long, have voted more than \$33,000,000.00 for improved road bonds!

I hear some motorist who got stuck in one of the few remaining mudholes in this section last summer say "Figures may not lie, but liars do use figures."

These few mudholes are the result of several causes, perhaps the most important of which is the localized conditions under which the funds are provided and the roads constructed. The figures are correct, and the respective amounts follow:

Western North Carolina .....	\$ 3,500,000.00
East Tennessee .....	8,000,000.00
Eastern Kentucky .....	3,500,000.00
Southwest Virginia .....	4,500,000.00
West Virginia .....	12,773,500.00
Bridge warrants and certificates and direct levies for road construction.....	750,000.00
<b>Total.....</b>	<b>\$33,023,500.00</b>

Of this total for ten years, \$11,000,000.00 was voted within the past year, and it is safe to assume that more than this \$11,000,000 has not yet been expended. Further, of the amount voted last year, 26 counties in West Virginia voted \$7,450,000.00, East Tennessee voted about \$1,000,000.00 and Eastern Kentucky voted more than \$1,000,000.00.

My doubting motoring friend will please understand that the few unfinished sections in the great inter-state highways which this association has been promoting throughout the Southern Appalachian Territory are due to the fact that these vast road funds have not yet

been expended, to the localized conditions mentioned above, and to the fact that there are still a few Districts, Townships and Counties which have not awakened to their condition and have not realized the absolute necessity, as a business proposition, of improved roads. However, the work of this association, and of other organizations, has been and is being continually directed to the improvement of these weak links, and remarkable progress has been made, especially considering these localized conditions, throughout this territory.

## Some of the Roads Built.

A recital of some of the more important improvements follows:

In Western North Carolina, important links in the Charlotte-Asheville Highway (Hickory Nut Gap Road) and in the Central Highway were improved, and these highways placed in fine condition for through travel, until the floods came and washed out bridges and fills, which it will require several months to rebuild. The recent floods greatly damaged the Asheville-Spartanburg Highway and the Asheville-Greenville Highway, and the work of repairing the damage is under way. Much interest has been aroused in the Asheville-Murphy Scenic Highway, which is a part of the Asheville-Murphy-Atlanta Highway and several bond issues have carried along this road.

Marked improvement has been made in the great highways extending along the Appalachian Valley. Funds previously provided have been applied to the Bristol-Washington Highway in several counties between Bristol and Roanoke, and the Salem District in Roanoke county voted \$125,000, with which this road will be resurfaced entirely through the county. All the unfinished gaps in the 156 miles of Bristol-Memphis Highway between Bristol and Knoxville have been macadamized except 12 miles at the Washington-Greene county line, and the 4 miles of this in Greene county will be macadamized this year. Contracts have been let for macadamizing the Bristol-Knoxville Highway through Hawkins and Grainger counties and the work is well under way, and this road will be macadamized the entire distance of 130 miles by the end of another year.

Construction work has gone forward on the Appalachian Way, the promotion of which was begun by this association at the Bluefield meeting last fall. Much work has been completed on this great Scenic Highway in West Virginia. Russell county has macadamized the 6 miles of this highway next to the Tazewell line. Tazewell has voted bonds to macadamize the 4 mile gap east of Tazewell courthouse. Washington county has continued macadamizing the road between Abingdon and Bristol. So that, of the 97 miles of Appalachian Way in Virginia, from Bristol to Bluefield, only 16 miles will remain unmacadamized this fall. Nine miles of this is between Greendale and Hansonville in Washington and Russell counties, and practically the whole

of Southwest Virginia has concentrated on this section of road to receive Federal Aid this year, with every prospect for success, although the Washington county funds have to be raised largely by private subscription—due to a local road law, and a financially weak District in a county which handles road matters by districts.

Attention should be called here to what the Automobile Blue Book Editors say is destined to be one of the most traveled tourist roads east of the Mississippi. That is, a connection between the Appalachian way and Staunton, Virginia. There is now a good graded road from White Sulphur Springs to Bluefield via Narrows, Va., and within another year a macadam road will be practically completed from Staunton via Hot Springs, White Sulphur Springs and the other noted resorts in that section via Hinton, to Bluefield. As soon as the Greendale-Hansonville gap is completed, there will be a macadam road from Staunton through these Springs to Bluefield and Bristol, and thence to Knoxville, or to Asheville via Elizabethton and Linville or via Morristown and Newport.

The section of Boone Way from Linville to Elizabethton is provided for and construction well under way, and will be open as a graded road by May 1, 1917, and a part of it will be macadamized this year and next. From Bristol to Cumberland Gap, about 100 miles, about 40 miles will be macadamized this fall, and funds are in hand to macadamize 15 additional miles. The road is all graded or provision made for grading except about 20 miles, which is fair dirt and gravel road. In Kentucky, between Cumberland Gap and Crab Orchard, the bonds were voted 20 months ago, and work is under way in all the counties, and the entire section will be macadamized by the fall of 1917. Since these bonds were voted, the Dixie Highway has been routed over this section of Boone Way.

#### **Federal Aid Will Help.**

The Federal Aid Road Bill, recently enacted, will, if rightly administered, go a long way towards aiding in the completion of these and other great inter-state highways. But if the Federal Aid is to be dissipated by trying the impossible of improving the road to the home of every local official, and all the local roads in America, then it had better be repealed at once. Our state policies have been wrong about road construction. Our State Highway Departments in the Southern Appalachian Territory have been too neutral regarding the expenditure of State Aid funds and the employment of convict forces. Instead of adopting a constructive state policy of building the main roads first, our policy has been to allow the local road authorities to say what roads shall be built, and the question is sometimes decided by one officer voting for another to have the state aid in return for a vote for the chairmanship of the board.

If we are to have the right kind of construction progress, we must enlarge our vision and plans; the Southern Appalachian States must take over the main highways and complete the unfinished links with State and Federal Aid and local funds, and then maintain them with state funds derived from automobile licenses or otherwise. If we do this, we will reap a golden harvest. Tens of thousands of tourists will annually motor over our white ribboned highways through our beautiful valleys and hills and mountains and delight to leave hundreds of millions of dollars, which will be used for the development of our vast natural resources and for the pleasure and happiness and usefulness of our people.

#### **Thirteen Transcontinental Highways.**

Although the transcontinental highways are still in the preliminary stages of permanent improvement recent classification of routes gives the number as thirteen. Of these roads seven run from east to west and six from north to south. They are as follows:

Lincoln Highway—New York to San Francisco, via Philadelphia, Pittsburg, Omaha, Denver, Cheyenne, Ogden, Salt Lake City and Reno.

Pike's Peak Ocean to Ocean Highway—New York to San Francisco, via New York, Washington, Wheeling, Indianapolis, St. Joseph, Colorado Springs, Salt Lake City and Reno.

National Old Trails—Washington to Los Angeles, via Wheeling, Indianapolis, St. Louis, Kansas City, Trinidad and Albuquerque.

Yellowstone Trail—Puget Sound to Plymouth Rock; Plymouth and Boston to Seattle and Tacoma via Poughkeepsie, Cleveland, Chicago, St. Paul, Minneapolis, Livingston (with side route to Yellowstone National Park), Missoula (with side route to Glacier National Park) and Spokane.

Trail to the Sunset and Santa Fe Trail—New York to San Diego via Chicago, Kansas City, Trinidad, Phoenix and Yuma.

Southern National Highway—Washington to San Diego, via Richmond, Durham, Nashville, Memphis, Little Rock, Dallas, Fort Worth, Roswell, El Paso, Phoenix and Yuma.

Old Spanish Trail—Florida to San Diego via Mobile, New Orleans, Houston, El Paso and Yuma.

Atlantic Highway—Calais to Miami via Boston, New York, Washington, Savannah and Jacksonville.

Meridian Road—Pembina to Galveston via Fargo, Columbus, Wichita, Fort Worth and Houston.

Pacific Highway—Vancouver to San Diego, via Seattle, Portland, San Francisco and Los Angeles.

Dixie Highway—Chicago to Miami via Indianapolis, Nashville and Atlanta.

Jefferson Highway—New Orleans to St. Paul and Minneapolis via Shreveport, Denison, Muskogee, Joplin or Fort Scott, Kansas City, Des Moines and Alebtr Lea.

Jackson Highway—Chicago to New Orleans via Louisville and Nashville.

#### **More Surfaced Roads for Iowa.**

Iowa contemplates the construction of surfaced roads on an extensive scale.

In a letter received by Paul Beer, chairman of the Greater Des Moines committee's good roads committee, B. R. White, road engineer of the Iowa highway commission, says that he has made an inspection of Indiana and Illinois road since the recent trip through Minnesota. He has collected data regarding highway expenditures in those states.

In commenting on the Minnesota trip with the Greater Des Moines committee and Polk county supervisors, Mr. White says:

"The long, continuous stretches of gravel road in Minnesota impressed me very much. To my mind, it makes very little difference whether these roads were smooth and in the very best condition, or somewhat wavy so that traveling at a high rate of speed was more or less uncomfortable. The big outstanding fact is that Minnesota has many miles of gravel road which can be traveled at any season of the year."

Coleman county, Tex., has formed a permanent association to boost good roads.

# Roanoke County, Virginia, Roads

By L. H. DUNCAN, Roanoke Chamber of Commerce

**R**OANOKE COUNTY, Virginia, is well on the way toward having a system of modern improved highways. Twenty-eight miles of good road have been built already and bonds have been issued for the construction of twenty-five miles more. All of this mileage has been built by convict labor from the native limestone rock, the cost, with the exception of two miles and a half to the Catawba Sanatorium built by the state, having been met by private subscription. The first of these roads, five miles in length, was begun in 1910 and finished the following year. The other roads followed in rapid succession and interest in the good roads movement has grown by leaps and bounds. Nearly all of the mileage leads out of Roanoke City.

The old Washington-Memphis Stage Road, built long before the Civil War and for many years the main artery of travel between Tennessee and the National capital, crosses Roanoke county from the Montgomery county line to the Botetourt county line. Lack of proper upkeep has allowed this magnificent highway to fall into decay until, at the present time, it is difficult of travel. After an active campaign under the leadership of the Roanoke county branch of the Virginia Road Builders's Association, the Salem magisterial district last spring voted a bond issue of \$125,000 to reconstruct this road. Work will be commenced in the near future and when completed the famous old stage road will come into its own again as a part of the Washington-Bristol Highway. With the completion of this road, Roanoke county will have a total of over fifty miles of first class macadam highways. It is practically certain that additional bonds will be issued by other districts in the county and that within the next two or three years Roanoke county will be crossed and recrossed by a network of modern roads.

On some of these roads the patrol system is now being inaugurated. Provision has already been made for the upkeep of the roads constructed in the past few years and will be made for additional roads as they are built. Roanoke county does not intend to build good roads and let them decay from lack of proper attention.

Roanoke is located on the National Highway and all of the roads in the immediate neighborhood of the city are good. Southward, from the Roanoke county line through Franklin county to the Henry county line, the roads are poor, but from that point on are excellent. Between Roanoke and Staunton, where the National Highway joins the famous Valley Turnpike, is a distance of approximately eighty miles. Thirty miles are macadamized but the remaining fifty are not so good.

A movement has been started by the Roanoke Automobile Association, affiliated with the Chamber of Commerce, and the Roanoke Rotary Club to have good roads replace the bad. An active campaign will be inaugurated to make the National Highway one of the best automobile routes in the country.

The plan which the committee has in mind will make a circular route extending from Indiana and Ohio southward along the Dixie Highway to Knoxville, eastward along the road to Bristol and the Washington-Bristol Highway to Roanoke, northward along the National Highway through Staunton to Washington

and Pittsburg, and westward along the Lincoln Highway. Much of this circle is now complete and the connecting link between Bristol and Staunton is in a fair way to become equal to the other portions.

This circle, if completed, will provide a delightful motor highway. Many motorists prefer to make their trips in spring, summer and fall when it is not desirable to journey to the far south. By turning back at Knoxville, the motorist is assured of a pleasant trip even in the hottest months of summer, for the larger part of the route leads through cool mountain country amid some of the greatest scenery on the continent.

## Big Demand for Road Engineers.

There is a large and ever-growing demand throughout the United States for road engineers. County roads commissioners commend the special bulletin which has been sent by the National Automobile Chamber of Commerce calling attention to the widespread demand for engineering graduates. The N. A. C. C. says that college and university students who have specialized in this branch of civil engineering will find unusual opportunities henceforth of securing good employment and good pay after winning their degree.

There has long been a decided lack of trained road engineers, and the demand for them is increasing rapidly. Probably no other branch in engineering offers such rewards at this time.

Eighteen state highway commissions out of 24 reporting to the National Automobile Chamber of Commerce in New York state that there is a lack of trained road engineers, and 16 say that preference would be given to graduates of college highway engineering courses in the appointment of additional road engineers.

Nearly 1,000 engineers are now employed by the 24 state commissions, and in addition, about 2,000 are employed as county and city engineers in 19 of the states.

Salaries of highway engineers range from \$900 to \$5,000 per year. The average is about \$1,800.

There has been a tremendous increase in highway improvements throughout the country during recent years and the demand for good roads is growing rapidly. Highway commissioners report to the national association that they anticipate the number of engineers employed by the state highway departments will be doubled during the next five years.

Enactment of the Federal Good Roads bill appropriating \$75,000,000 for the construction of public roads during the next five years, provided the various state appropriate an equal amount, assures the expenditure of \$150,000,000 on main state highways in that period. This will greatly stimulate the building of minor roads by states and counties.

It is expected that over \$250,000,000 will be spent yearly from now on for the construction of roads throughout America.

County Engineer Witt, of Dallas county, Texas, has submitted to the county commissioners recommendations that \$1,600,000 be appropriated for road work.

Lafayette county, Fla., votes October 17 on a bond issue of \$600,000 for road construction.

### A Roadside Fairy Land.

Los Angeles County, California, is the American Riviera, and in no way is the visitor more reminded of the beauty of the famous Mediterranean playground than in the treatment of the roadsides. There is one broad boulevard where, for eighteen miles, one travels between continuous rose bowers backed with palms or firs. About 50,000 rose bushes of fifty varieties were used in this landscape gardening. In many places the roads wind through orange, lemon and walnut groves separated from the roadway by masses of rose bushes four to six feet high, which charm the eye and fill the air with fragrance even in December. This work was done by individuals, but it was so successful that about two years ago a committee was organized to carry on such roadside treatment on a larger scale and in accordance with comprehensive plans. Funds were raised by a direct tax, and the county forestry department was placed in charge of the execution of the project. About two hundred miles of road now have ninety road trellises to the mile of highway. Each trellis is twenty feet long, five feet high and supports five bushes. About thirty varieties of roses are used, selected to thrive in the soil at each trellis and give an attractive combination of colors. In addition poppies, petunias and geraniums, which grow luxuriantly in that climate, have also been used along the boulevards, and palms and eucalyptus trees have been set out where necessary to break flat monotony or furnish a background. While there are few places that have the climate and wealth to make the roadsides such charming pictures, a great deal can be done elsewhere, with only a little money and time, to change the neglected frowsy rights-of-way into attractive lanes.

### Views on Concrete Road Building.

The Commission of Road Legislation of the State of New Jersey has asked that contractors and engineers write them of their views to remedying the road situation in that state. Mr. Pierre N. Beringer, of New York City, deals with concrete roads in the following:

September 1, 1916.

To the Commission on Road Legislation of the State of New Jersey,

Trenton, New Jersey.

Dear Sirs:—

I note your request through the press for opinions on the subject of road building, and as to what is the matter with the roads of New Jersey.

The trouble with the New Jersey roads is the same as it is with the roads in nearly every state in the Union. Today the states of New York and California stand at the head as builders of permanent roads, and we must go back to the days of Napoleon to find the condition which fits the case. It was demonstrated by Tresauget that no road could be deemed permanent unless it was maintained. Napoleon said that the building of a road was the simplest and the most inexpensive part of the performance.

Concrete roads or roads with concrete base will solve the question for New Jersey and all other states, if a system of maintenance is adopted. The splendid water-bound macadam roads New Jersey once possessed, and of which she was so justly proud, have been cut up by wagon wheels and scattered about by the automobile, and they cost the State of New Jersey more than \$10,000 a mile. The bituminous road cost about \$13,000 a mile, while the first class concrete road will cost \$15,000 a mile, and a brick pavement about \$25,000 a mile.

These figures include engineering and inspection. Any road without a concrete foundation, any road of the macadam type, waterbound, belongs to the dark ages. All roads should have concrete base or be built entirely of concrete, and, in addition, the State of New Jersey and all other states should adopt a uniform system of maintenance, and it is not believed that the system established by Napoleon and Tresauget can be improved upon.

The Napoleonic maintenance system roughly was as follows: A group of ten men have charge of the road for ten miles. These are under the supervision of an engineer or road master, and every 100 miles is again under the supervision of an expert engineer and road builder. Each of these 100 mile supervisors are in turn responsible to the department of Ponts et Chaussée, or Roads and Bridges, which in turn is responsible to the Ministry of Public Works. Material for the repairs of the slightest defects on the roads in normal times is held at hand for every mile of the road system of France, and until the development of the automobile and the present war, France possessed the best roads in the world, and these were maintained at the least cost.

It seems to me that the problem is simply one of maintenance, money, and common sense.

Concrete roads with concrete surfaces are no longer in the experimental age. Some years ago, before engineers and contractors were familiar with their construction and were convinced of their durability, the cost of making these roads ranged from \$1.00 to \$1.50 per square yard. Now the price of 90c. per square yard for these roads is quite common in several different states, which compares very well with the cost of building the waterbound macadam roads, which type is no longer suitable for modern traffic.

All of which is respectfully submitted.

(Signed.)

P. N. BERINGER.

### Georgians Are Worried.

The Georgia press refuses to be satisfied with the state highway commission bill. A press report from Atlanta says:

"Will the state of Georgia get her share of the federal appropriation for public roads with the highway commission which has just been created by the legislature?"

"According to official advices from Washington, the commission does not meet the requirements of the federal act and the state of Georgia, therefore, will lose her share of the appropriation.

"The bill passed by the house creates a highway commission consisting of the three members of the prison commission. The senate amended the bill by adding the state geologist, the professor of civil engineering at Georgia Tech, and the professor of civil engineering at the University of Georgia to the commission. This amendment was agreed to by the house.

"The commission still lacks authority, still lacks funds, still lacks a highway engineer, still lacks clerical help and the numerous and various other functions and facilities necessary to organize an efficient highway department."

Harris county, Tex., containing the city of Houston, has now established itself as one of the leading good roads counties of the south, with 400 miles of improved roads branching out in every direction from Houston.

### Good From Road Competition.

Kansas and Missouri are having one of the strongest competitive good road campaigns this fall that have ever been witnessed in these states which are already traversed by numerous automobile highways. The new competition—it has been waging several weeks—is concerning a section of the new Jefferson highway, the section between Kansas City and Joplin. There is one route projected in Missouri near the west state line and one in Kansas near the eastern boundary. Between these two there will be another "border war" although with less of bad feeling than the one in the late 50s.

If the matter could be settled merely between the two states it would be competition enough. But, to make interest keener, one section of the Kansas projection is having its division of support that has already caused a great deal of rivalry and a whole lot of good in a race to see which section will pull the Jefferson highway.

The Jefferson highway is a north and south road extending from Winnipeg, Canada, on the north, to New Orleans on the south. Its route has been fairly well established from Winnipeg to Kansas City and from Joplin, through Oklahoma, Texas and Louisiana. From Winnipeg the route touches Fargo, N. D.; Minneapolis, Faribault and Albert Lea in Minnesota; Des Moines, Ia.; Bethany, Mo.; St. Joseph and Kansas City. A cut-off is being proposed between Bethany and Kansas City.

From Joplin, although the apparently feasible line would follow the Ozark trails south through Arkansas, the road has been routed to Tulsa, Oklahoma City, Dallas, Denison and on to the gulf. But more about the unrouted section from Kansas City to Joplin.

The Missouri proposed line which is competing for the official indorsement in the gap between Kansas City and Joplin has been routed by the Missouri good roads boosters south to Hickman Mills, east past Longview farm to within about a mile of Lee Summit, then competing for the indorsement in the gap between Kansas City and Joplin has been routed by the Missouri good road boosters south to Hickman Mills, east past Longview farm to within about a mile of Lees Summit, then south and east to Harrisonville, Mo. The distance to Harrisonville is forty-four miles. From there the line goes almost directly south through Butler, Rich Hill, Nevada, Lamar, Carthage and Joplin.

The Kansas contenders in the border warfare are pulling together on the road from Kansas City as far south as Paola—and a little beyond. They have established a "parting of the ways" there, however. Faction number 1—to distinguish the factions—wants the highway to follow the road from Kansas City to La Cygne, thence south through old Trading Post, Pleasanton and Prescott to Fulton, Fort Scott and Pittsburg.

Faction number 2 would follow the same line to a point twelve and one-half miles south of Paola to within two miles of the Miami-Linn county line. They would then follow the route which branches west two miles to keep out of the Marais des Cygne bottoms, then turn south and follow what is called the "ridge road" through Cadmus, Farlinville, Mound City, Matley and thence east to Fulton, where it will join the line contended for by faction number 1.

The rivalry has been the cause of building a lot of good road, some of it permanent road, in Kansas. The campaign, although a warm one, has not yet reached its height and the matter may be finally settled by the

Jefferson highway designating two, and possibly all three, routes as a part of its map and leave the tourists to choose, guided by the existing condition of road or weather.

But the country southward of Kansas City is getting the benefit of the rivalry in some better roads, which is the best good that can come of any highway projection.

### Big Road Victory in N. C. Country.

The greatest day in the history of Wilkes county, N. C., was Saturday, Sept. 16. It was the culmination of one of the most splendid campaigns ever handled in the state, and the result was the carrying of the good roads bonds for the county. The amount voted was \$250,000 and with the addition of the same amount from the government, which is anticipated, a system of good roads, it is estimated, can be built in Wilkes that will not only make it complete for the county, but an important factor in the development of a general road system for this western section of the state and the adjoining territory of Virginia and Tennessee.

For years Wilkes has struggled under heavy burden imposed by mud. It has been the one drawback to her progress. With that hindrance removed Wilkes can easily take her rightful position among the very best in the south.

Immediately upon the heels of the July flood which demolished the county, it was evident to the progressive good roads advocates that the time had arrived for a good roads bond election, and it was quickly inaugurated. A committee consisting of County Demonstrator A. G. Hendren, chairman, E. M. Blackburn, secretary, J. J. Rogers, J. L. Hemphill, T. S. Hubbard, J. H. Johnson, E. B. Barkley, F. C. Forester, D. J. Brookshire, J. B. Norris, C. H. Cowles, F. B. Hendren, R. N. Hackett was elected to plan a campaign and such a campaign as was waged from the top of the Blue Ridge on the north to the crest of the Brushy mountain was never witnessed. Republicans and Democrats forgot their political affiliations, and worked shoulder to shoulder for a common cause. Leaders who took the stump for the issue were: Solicitor John J. Hayes, ex-Sheriff J. H. Johnson, C. C. Gambill, J. B. Norris, Rev. A. T. Abernethy, ex-Sheriff J. E. McEwen, ex-Representative L. Bumgarner, H. C. Caviness, E. C. Willis, R. N. Hackett, T. B. Finley, J. A. Rousseau, John A. Jones, F. B. Hendren, C. G. Gilbreath, F. D. Hackett and others, visiting every nook and corner of the county and informing the people on the provisions of the proposed road law, and the result has been that within about 30 days a sentiment that would have been against bonds by about 2,000 was changed to favor the same by about 1,600. The good roads law enacted by the last legislature was found to be the strongest campaign document. The opponents could not find a flaw in it. Every point had been carefully and properly figured out to suit the conditions for which it was intended, and on its merits the law won.

Valuable aid was rendered by some outside friends who dropped in to lend a hand at the critical moment, among them Governor Craig, Col. Fred Olds, of Raleigh, A. L. Brooks and J. C. Forester, of Greensboro.

The Willys-Overland company has contributed a sum of \$50,000 for the Lincoln Highway through the Nevada desert, the state of Nevada to contribute a like supplementary sum.

### Good Roads and Country Churches.

Mr. James D. Burton, writing in the B. Y. P. U. quarterly, speaks of the opening of opportunity for enlarged work by the country churches with the coming of good roads to the South, in the following article of recent date:

Roman roads played an important part in the political fortunes of the Roman empire. And with the coming of good roads in the South we expect to see it play an important part in our educational, social, and religious life. We expect to see many features of our work undergoing changes and readjustments to meet the new order of things. Good roads and automobiles have an important bearing on country church work. It either adds or detracts from the services of the country church. In this connection it seems to the writer that the B. Y. P. U. has a mission to perform.

#### Seizing the Opportunity.

Not long since the writer witnessed three auto-truck wagons coming into Harriman, Tennessee, on a Sunday afternoon, loaded with young people. They had attended a B. Y. P. U. afternoon rally at a country church on a pike road several miles from town. They had arranged a program, and it had been carried out at this country church. There were several young people's societies represented in the meeting. Their topic, in which all societies took part, was "Heroes of the Bible." It was a great day in the history of this country church. Friendships were formed, interest in young people's work increased, a Christian service for and by young people gave emphasis to the place of young people in the work of the church.

The auto-truck wagons had been engaged for the afternoon by the B. Y. P. U. The wholesale houses and business firms of the city had let out the trucks for this religious meeting. This was suggestive of the opportunities our young people in the cities have of doing Christian service in rural districts as a result of good roads.

The completion of pike roads in almost all of the counties in the Southern States during the past year or two should bring the country church into closer fellowship with the city church, and through the good offices of the city church have the work in the country made stronger and better. The city B. Y. P. U. can help the young people of the rural districts to organize and maintain young people's organizations at country churches. They can go to the country church Sunday afternoons, and get back to their own society for the evening service. This is made possible as the result of good roads and the automobile. Why not get out and "possess the land." "The fields are already white unto the harvest."

#### Keeping the Country Church Alive.

We hear of the decline of the country church. This decline has not been as large in the South as in some other sections of the country. But with the advent of the pike road it will call for more attention. The tendency of the people in the country will be to neglect their own church, because of the lack of attractive programs and meetings. Here is a chance for the B. Y. P. U. Take advantage of the good roads, and get out to the country churches, and help set up interesting programs for the young people. Saving the country church will be a fine piece of work. Special collections to defray the expenses of these trips could be taken up by the B. Y. P. U.

A great deal of time and attention are being given

to community work in various forms. To my mind the coming of good roads offers to the city B. Y. P. U. a fine chance to do a real community service. The President of the Union could take the minutes of the country churches which are within reach of his city or town, get in communication with some leader in each church, and begin a systematic plan of visitation with his corp of trained leaders. It will call for the exercise of good judgment, common sense, and tact. The methods used should bring the young people of the country and city closer together instead of bringing about walls of division between them. And it is not to be supposed that a rural B. Y. P. U. can or will be run just like a city B. Y. P. U. All these things should be taken into consideration. Good roads open up a larger field of service for the B. Y. P. U. What are we going to do about it?

Our Southern highlands, valleys, and plains feel the awakening which pike road construction is bringing about. We stand at the threshold of a new day. May we make the country churches along these great highways life-saving stations for the multitude. The country is the recruiting ground for our city churches. We owe much to the country church. We cannot afford to neglect our duty in this direction. "The way is now open" for the extension of the B. Y. P. U. work in country districts.

#### Road Legislation for Texas.

Construction of good roads in Texas will be one of the leading issues at the next session of the legislature. Senator Carlos Bee, of San Antonio, has several measures pertaining to this proposition now in course of preparation. He will advocate a measure amending the present law relative to the issuance of road bonds so that when a county issues such bonds there will be provided a road maintenance fund which will be as sacred as the usual sinking fund. This, he points out, will provide the means for maintaining the roads that have been built. Representative Tillotson of Austin county also has a bill looking to the creation of a state highway commission.

#### Road Work in Brooke County.

Mr. C. A. Eicheilberger, county engineer of Brooke county, Wellsburg, W. Virginia, has advertised 10 5-10 miles of road construction, bids to be received till 2 p. m., October 20th.

Road No. 9, Bethany Pike, 6 8-10 miles.

Road No. 1, Section No. 2 from Stubenville bridge to Holiday Cove, 3 1-10 miles.

Road No. 1, Section No. 1; Road No. 8, Section No. 1, from 22nd to 27th St., of the city of Wellsburg, to Mine No. 4 of the West Virginia & Pittsburgh Coal Company.

This is a part of the general system of road improvement of Brooke county proposed under the \$800,000 bond issue voted June 20th.

Plans and specifications will be on file and can be seen at the office of the county engineer at Wellsburg, W. Va.

Cyrus Kehr, of Knoxville, contributed a feature to the Southern Appalachian convention at Lexington, Ky., by declaring that there is too much craze about national highways and that the proper connection of important centers is being lost sight of.

Denton county, Texas, has under consideration the disposal of \$800,000 of good roads bonds.

# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### Arkansas.

Increase in the work of the State Highways Commission, due to the stimulus in road building under the Alexander law has caused the department to outgrow its quarters at the state capitol and it now occupies space on three floors. The main office remains on the first floor, but a blue print-room has been fitted up in the basement and a drafting room in a legislative committee room on the third floor. It is probable the next legislature will be asked to enlarge the space of the department.

Hugh R. Carter, state highway engineer, recently sent to the Johnson county court plans for a macadam road to be built across the county from east to west, 10 miles, to cost \$175,000.

\* \* \*

### Colorado.

The fame of Colorado's good roads and matchless scenery has brought more than 25,000 visiting automobiles to the state during the summer months this year, says T. J. Ehrhart, state highway commissioner.

The cars have averaged four passengers each, so that the number of automobile tourists who have been in the state this year is at least 100,000. Most of them have spent a month here. Estimating the expense at \$3 a day to each person, Ehrhart arrives at the conclusion that the auto tourists have spent \$9,000,000 or more in the state up to August 15. And the season was only half over.

These figures have been compiled after a careful investigation. Letters were sent out some time ago to as many auto tourists as the state highway department could reach. Without exception the visitors, in reply, have declared enthusiastically that the roads were the best that they had found in any state, excepting the extreme East and California, where millions have been spent.

The tourists pronounced themselves so well pleased with the state and the facilities afforded visiting cars that they intend to return next year.

Reports received by the highway department indicate that the travel over the roads in all sections of this state in the last two months has been unparalleled. All the mountain resorts and larger cities have been crowded with visitors. Hotels have been filled to overflowing, so that tourists, with plenty of money to spend have been forced to content themselves with accommodations in small rooming houses.

"There is no doubt that the auto traffic will go on increasing each year until the entire mountain section of the state will be occupied by visitors during the summer months," said Ehrhart. "Our roads are in such condition now that cars can travel from end to end of the state over good highways. Some people come here intending to remain a few days and decide to spend their entire vacation time here. The minimum expense for each person in a party averages \$3 a day, so that an enormous sum has been spent in the state by tourists this season.

"The only complaint is that hotels in all parts of the state are so crowded that it is almost impossible to get

accommodations. One man going to Colorado Springs for example, was much aggrieved because he couldn't get a room in the best hotel there. He was out to give his wife a good time and they had to take a room in a small boarding house. The same thing is true in all the other cities, while the mountain resorts are filled to overflowing.

"I estimate the number of visiting autos at 25,000, but that is very conservative and probably underestimated."

\* \* \*

### Texas.

From the state capital comes the information that Gov. Ferguson will recommend to the next legislature the creation of a state highway commission. The need of such a body has long been recognized, but as nothing had developed until recently to make the need so apparent as to take class as a necessity, no action has been taken toward writing it among the laws of the state, but now that it has been decreed that no state shall be eligible to participate in the \$75,000,000 appropriated by the federal government for good roads, unless that state has a highway commission, it becomes obvious that now is the time to call into existence such a body.

Despite the fact that Texas has had no road commission remarkable progress had been made in the construction of good roads during the past decade. Almost every county in the state has recognized the necessity for having better roads and millions of dollars have been spent in bringing these highways into existence; but we have only touched the outer rim of the proposition; there is a present need for additional roads, and at the rate the state is growing in population and commercial importance, there will be a demand for better hauling and traveling facilities for many years yet to come. To properly look after this matter, Texas needs a highway commission.

Already plans are on foot to use Texas' share of the federal appropriation of \$5,000,000 for good roads. It is the plan of D. E. Colp, secretary of the Texas Good Roads association, to use this money in building a model road from Dallas to Mineral Wells, by way of Fort Worth and Weatherford, using the Tarrant county road system as a part of the road. Secretary Colp says he finds very little opposition to the creation of a state highway commission.

\* \* \*

### Virginia.

The Rural Road Improvement League, which is promoting the "community work" in road improvement in several counties of the state, is urging that the bad places in the main thoroughfares of the Commonwealth be improved. The latest bulletin of the Rural Road Improvement League contains the following, under the caption, "Connect All Through Highways:"

"The question is now whether the people of Virginia really wish to have tourists come through this state. Much has been said and written on this subject and some work has been done toward the improvement of connecting links in certain important through high-

ways, but there are yet some very short links of almost impassable road on these important routes which render the entire routes undesirable when these bad spots have to be encountered on a trip. If the people of Virginia wish tourists to come through the Old Dominion they must mend their highways. This will be a very simple matter if we will go about it properly, and its early accomplishment will prove very profitable.

"It is said that the Richmond-Washington Highway is expected to be in good condition for travel by next summer; but as this has been said every fall for several years and the delay is causing considerable dissatisfaction to contributors, it is our aim to get it completed in passable shape immediately, and we hope the business people of Richmond and other points affected will co-operate for its immediate completion. The Richmond-Charlottesville "Mountain Road" is next in importance to Richmond and other points in Virginia and should be given its share of attention too; and the continuation of this highway to Old Point is very necessary, to complete the "Sea-to-the-Mountains Highway" and to bring into the state travel that would otherwise go by boat to the south or to northern sections.

#### Hustle Along Jefferson Highway.

General Manager Walter Parker, of the New Orleans Association of Commerce, finds that cities, counties and states north are moving together for construction of the New Orleans-Winnipeg highway. Mr. Parker and other officials of the Jefferson Highway association recently finished an overland tour of the north section of the road, 1,700 miles long. The tour began at St. Joseph, Mo., and ended at Winnipeg.

In November an excursion over the southern link, from St. Joseph to New Orleans, is to be made, the expectation being that 100 automobiles will participate.

Recounting the results of the northern tour, Mr. Parker said:

"After motoring 1700 miles over the Jefferson highway on a tour of inspection, I am convinced that before very long—years before the completion of the Lincoln highway—a great roadway, good in rain or shine, and safe for travel 365 days each year, will be ready for business between New Orleans and Winnipeg.

"The Jefferson Highway association was organized on the call of the New Orleans Association of Commerce, at a great convention held in New Orleans November 15 and 16, 1915.

"Today, 25 per cent of the entire mileage between New Orleans and Winnipeg has been hard-surfaced, and stands good for travel at normal speed 365 days in the year, while appropriations have been made and the money is available for the hard-surfacing of another 25 per cent. By January 1, another 10 per cent of the roadway will have been provided for.

"Fully 75 per cent of the counties along the highway have been fully organized and have paid in or are arranging to pay in, for the support of the present body, a tax of \$9 per mile. In addition, six membership subscriptions of \$1,000 each and one of \$500 have been taken out in the Jefferson Highway association by towns and individuals.

"In this way, a total fund of \$200,000 will be raised, half of which will go for the support of the general organization, the operation of demonstration road-building machinery, and in aid of such localities as may ex-

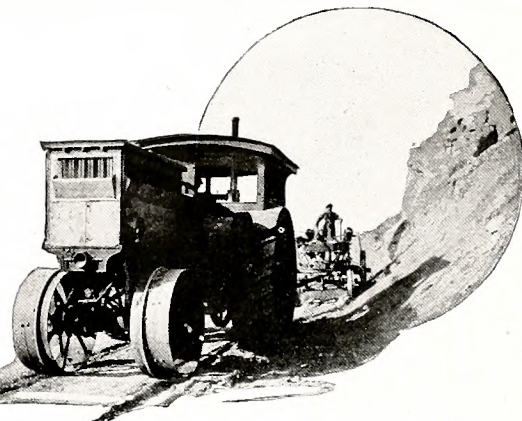
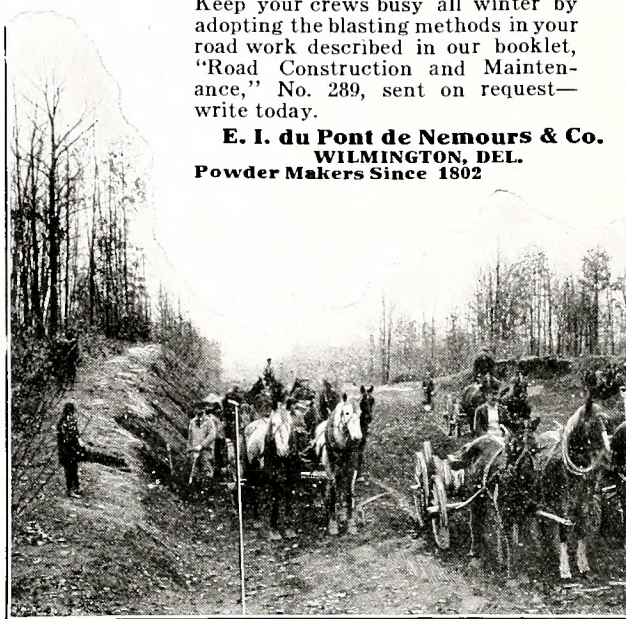
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Possibly your road maintenance costs are higher than they need be. Perhaps a little investigation would pay. Would you like to see some of the figures we have collected—some of the savings we have helped other contractors and road builders to make by changing over to Mogul or Titan kerosene tractor power? They'll cost you nothing but a two-cent stamp and a little time. Write for them.

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"The other half will be placed at interest, and the income used for the maintenance of a permanent bureau of inspection in order that the highway, when completed, will not be permitted to fall into poor condition.

#### Motor Road to Mount Vernon.

The American Automobile Association—District of Columbia Club—is authority for the statement that a first-class motor highway now exists between the National Capital and Mount Vernon.

Local motorists desirous to make this trip for their own pleasure, and those who wish to utilize the modern transportation methods to take visiting friends to view the resting place of the father of his country, will welcome the news that an automobile trip to Mount Vernon can now be made comfortably.

Following its usual custom minutely charting the roads to places of unusual interest, the District Club will shortly issue a post-card map of the Washington-Mount Vernon route. This, like the one issued about a year ago, will be so arranged as to make it impossible for a person to go wrong on the road, and when completed will be mailed gratis to members of the club.

A detail post-card map of the route from the National Capital to Annapolis, via Upper Marlboro, is now in process of production by A. G. Seiler, the club's official draftsman. This is being produced as the result of considerable demand for the short route to the United States Naval Academy, especially as there is now a tourable short route. Members of the club will receive this map also free when completed.

#### Capper for Prisoners on Roads.

Governor Capper of Kansas, is an ardent advocate of road work for misdemeanor prisoners. He recently addressed a letter to the mayors of the larger cities and the sheriffs of the larger counties in Kansas asking their opinion as to the advisability of seeking legislation which will permit work of this kind. The Governor's letter is in part:

"To my mind, our present system of handling city and county prisoners is entirely too expensive, not only to the public, but to the prisoners themselves. The public is out the money which it costs to maintain such prisoners in slothful idleness; the prisoners suffer because of lack of opportunity for physical, moral and mental development. Criminologists all agree that, as a rule, city and county prisoners are worse when they leave our prisons than when they enter them. Many of these prisoners are prisoners from other states who would rather serve time in jail than expend their efforts gainfully. Under our present system they are really pensioned for vagrancy. The public now virtually says to them: You are vagrants and won't work, therefore we will put you where you can't work—and where we can pay your board and lodging while you plan more crimes to commit."

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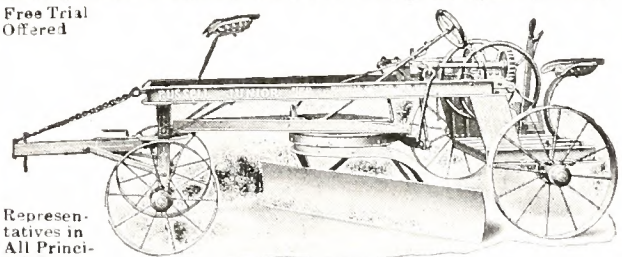
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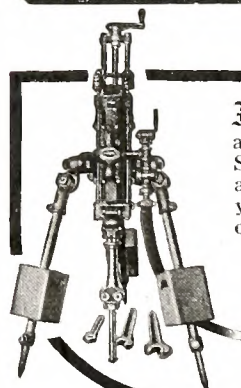
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## GOOD ROADS NOTES <sup>IN</sup> BRIEF

From El Paso, Texas, to Anthony, N. M., a concrete road is being built. Two bodies of workmen, working double shifts daily are engaged in pouring 500 feet of concrete per day.

Fayette county, W. Va., has \$600,000 available in the Fayetteville road district for road construction in the early spring.

The directors of the Forrest Highway Association in session at Rome, Ga., refused a proposal to merge with the Dixie Highway Association. Several hundred markers have been bought and are being placed along the Rome-Birmingham-Pensacola route.

Wood county, Texas, is conducting a campaign for \$150,000 bonds to build hard surfaced roads.

Guilford county, N. C., upon the completion of 20 miles of concrete-asphalt highways is now contemplating borrowing a round million dollars to continue the work begun. Work has also recently been begun in resurfacing some of the wornout macadam. Cross country roads are being built of topsoil.

Wilkes county, N. C., has organized its county highway commission, with R. Don Laws as chairman and H. W. Horton, secretary. The \$250,000 bond issue voted will be supplemented by Federal funds secured under the special flood relief act and the regular Federal fund.

Five great trunk line highways now lead to New Orleans, according to Walter Parker, General Manager New Orleans Association of Commerce.

Warden S. L. Morley of the Oklahoma penitentiary reports that convict road work is so popular in his

state that the demand for convicts cannot be supplied.

Franklin County, Ky., will erect signs along the road over which is route the Jackson Highway, Midland Trail and Boone Highway.

The Texas Good Roads Congress, held in San Antonio, voted to support the Tillotson bill for the creation of a state highway commission.

Clerk Callaway and Engineer Gallaher, of the Knox county, Tenn., road commission report \$50,000 damage done roads in that county by recent floods. The damage is to be repaired without delay.

The Central Florida Highway Association held its meeting in Fort Myers last month. Road interest has not abated in Florida and it appears the state will maintain its fine record of the past year or so.

The Wauchula district, Fla., completed recently ten and a half miles of brick roads and will finish 30 miles of rock roads in November.

Women's organizations of St. Lucie county, Fla., expect to undertake the beautification of the fifty mile stretch of highway along the Indian River.

Wayne county, Miss., people have appointed committees to look after securing a good highway from Mobile, Ala., to Shabuta, Miss., where connection will be made with the Jackson Highway, thus linking up the cities of Mobile and Meridian.

The construction of good roads is not confined to the more populous sections of Texas, but has spread to the remote and newly settled parts of the state. In the Panhandle and South Plains region, where road improvements had heretofore received little attention, the different counties have become interested in the propaganda and much progress is being made in constructing first-class highways.

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# SOUTHERN GOOD ROADS

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## Relation of Improvement and Maintenance of Roads to the State's Development

From an Address of A. D. WILLIAMS

Chief Road Engineer of West Virginia, Before State Board of Trade  
at Clarkton, W. Va.

AS citizens and friends of West Virginia we rejoice in her achievements. West Virginia is a State, great in transportation power, great in fuel energy, great in agricultural opportunities, great in industrial advantages, great in natural gas resources, great in horticultural possibilities, great in educational achievements, great in the spirit of hospitality and friendship, great in scenic beauty, great in a patriotism that inspires a loyal citizenship to the noblest of endeavors. But with all of these angles of greatness, like a shackled ancient slave, she is bound by avenues of mud and barriers of stone.

A glance at the pages of history will reveal the fact that the progress of civilization has found its course in the evolution of transportation and the measure of attained civilization in the eyes of the world is based upon the condition of the highways in the observed community. This fact is true in West Virginia. The lack of improved roads is costing the state an annual tax of approximately \$50,000,000 and in as much as there are about 100,000 farms, the annual loss is approximately \$500 for each farm within the state, besides the unestimable cost of hampering education, industrial, and social progress.

### Build the Road and the Road Will Build the Farm.

The state's agricultural and horticultural resources are not and can not be developed to their full fruition until a system of transportation is inaugurated and means of communication provided. We are now spending, counting the amount received from federal sources, approximately, \$250,000 per annum to promote agricultural training and efficiency and less than \$17,000 to inspire, inaugurate, promote, and direct the establishment and construction of a system of roads that will make possible the utilization of these efforts. The need of agricultural training and inspiration is recognized by all, but what is the use of planting a tree where we can not get the fruit until we provide the way. It is poor encouragement to go to a man and tell him how he can grow two bushels of potatoes, or any other crop where he now grows one when he cannot market what he has to a profit. Our trouble today does not lie so much in lack of production as in impossible utilization due to lack of transportation. Build

your roads and they in turn will enable you to build your farms, erect your schools, and churches, and help you to improve your social, industrial, and economical conditions.

### Board of Trade Fathers Road Movement.

There is no greater problem before the people of our Little Mountain State than the improvement and maintenance of our high-ways, and fifty-three years from now, the truth of this will be more apparent than tonight. This, I feel, is realized by this board, especially can such be said of our loyal and patriotic president who has given unselfishly of both his time and means to help promote the Good Roads Movement throughout the state and to help build good roads generally. Many others have performed their part and due credit should be given all. This organization can be called the parent of the Good Roads Movement in the state. In 1908, it was a committee of this body, appointed by the governor in response to a resolution, drafted by you Mr. Chairman, that revised the Road Laws of the state which by act of the legislature of 1909 created the first State Highway Department, and from the members of this body the present incumbent has received much assistance and encouragement. The improvement of our roads is a business proposition and demands business methods. It should and must be kept free from any partisan influences. This has been done thus far and we have made great strides during the past two years but much remains to be done. We have just begun.

### Have Made Progress But Face Danger.

In the field of finance we have made a home run, but the bat of destruction is at the plate, the child of neglect is on first base, the son of indifference is on the second, while the captain of an antiquated system occupies the third, with the pitcher of selfishness yet in the box and masked anxiety on the seat of time awaiting the results.

### Funds Provided.

When the first resolution of this body set the bark of good roads assail, there were less than five hundred miles of improved roads within the borders of the state. The first bond issue for improved roads was voted in Parkersburg District in Wood county in 1911. When

the present department was organized in 1913, there had been voted the sum of \$880,000, more than \$500,000 of which was unexpended. There has been voted, counting the \$800,000 just reported as Brook county's birthday gift, a total of \$12,388,500 to this date, with \$375,000 more to be voted on between now and the end of this month in Mineral and Wood counties. Of this amount approximately \$10,000,000 is unexpended, to which we can add \$2,000,000 from levies for the coming fiscal year. There has been a total of fifty-six different bond issues of which fifty-two have been voted since your servant laid hand to the wheel. During the past two years, \$2,628,000 of proposed bond issues have been defeated.

#### Miles of Road Demand Best Ability.

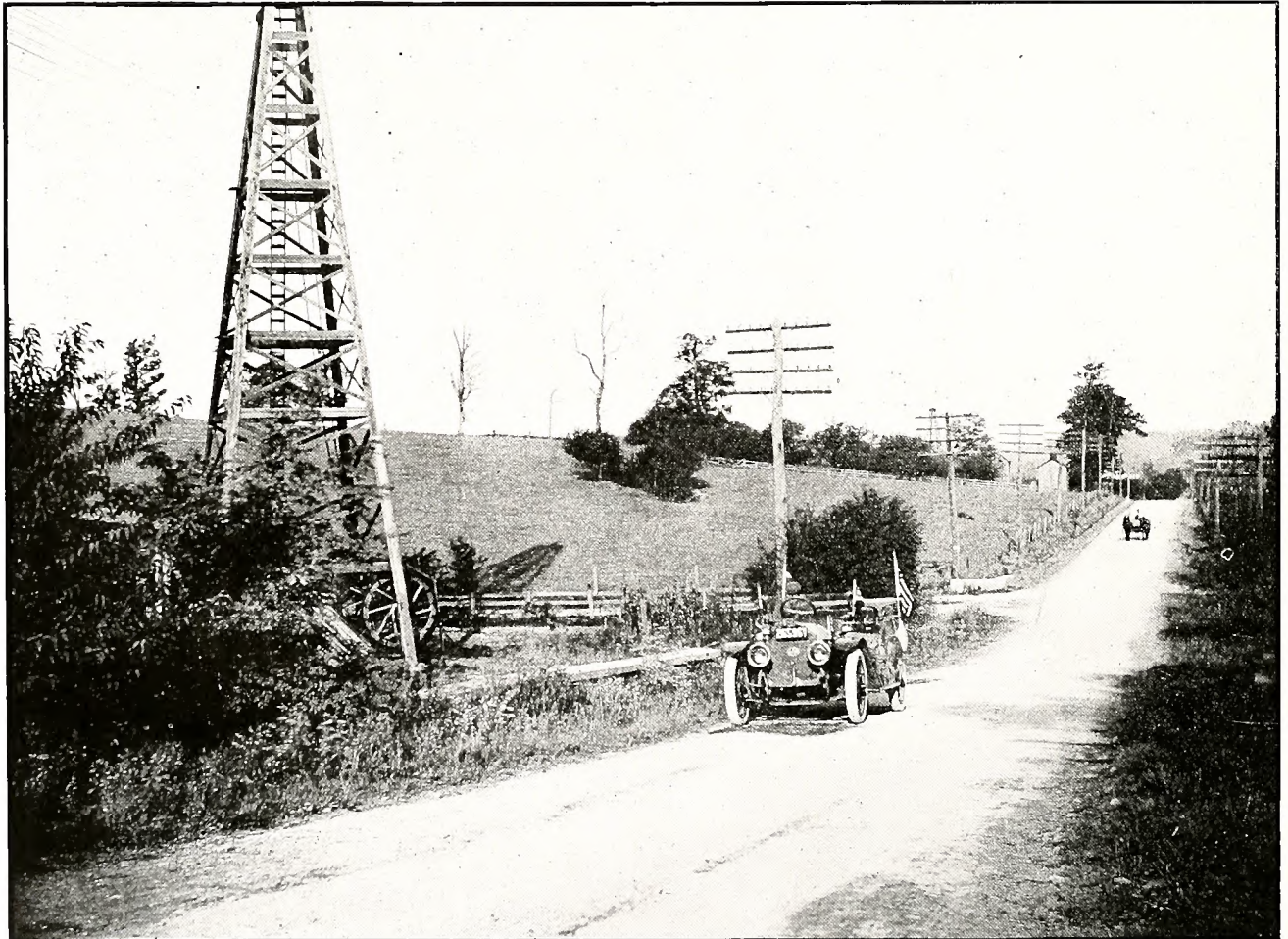
There is in this state a total of nearly 32,000 miles of roads. Of this amount approximately 3,000 miles have been improved or provided for since the creation of the State Road Bureau, and tonight, I feel, that I should be untrue to myself and unfaithful to you, and disloyal to my trust if I did not lay before you the problems that present themselves to me.

The road movement in West Virginia is in its infancy. We have but started on the greatest movement that confronts our people, the one that touches every avenue of life, and while we realize the importance of good roads, I fear that we do not realize the graveness of the situation that confronts us in the expenditure of this vast fund and the maintenance of the roads after they are constructed. It is one thing to get a receipt for money expended and another to get results

for the expenditure. On the former, in the past, we have laid much stress, but to the latter we have given but little attention and herein our great danger lies.

#### Road Bureau Has Produced Results.

For the latter purpose, the State Road Bureau was created, but like a wingless bird cast upon the bosom of the storm or a sail-less ship on the waves of a mad-dened ocean, considering the task before it, it has been turned loose as the children of Israel in the wilderness of prejudice to depend upon the manner of generosity for existence. For its printing it has had to fall at the feet of the department of agriculture. Important reports, bulletins, papers, and statistical tables are held in the hand of the printing clerk for lack of funds to print. We are lacking in scientifically trained, practical men. We are lacking in available statistics that bear on our conditions and are liable to suffer loss in money and energy for the want of facilities to place in the hands of the people in each locality, information they should have. For necessary expenses, the bureau has been compelled to appeal to the kindness of county courts, but hampered and bound as we have been tonight we can justly and proudly say we have accomplished results worthy of greater department. On the change of type and kind of bonds being voted, we have effected a saving to the taxpayers of over \$3,000,000; we have designed and inspected over \$625,000 worth of bridges, prepared twenty-two bulletins, and two reports, written 28,965 letters, mailed 37,000 pamphlets, given 20,400 opinion, held 1255 meetings, 753 conferences, reached 111,797 people in these meet-



Fine Type of Macadam Road near Wheeling, W. Va.



Section of Macadam Road Between Bluefield and Princeton, W. Va.

ings and conferences, traveled 162,248 miles at an expenditure of .0303 cents per mile, besides keeping up other work with but a very small appropriation. We stand on the hill-top of progress with our faces turned sunward and our actions inspired as our view falls down the vista of time to behold a state system of highways paved with enduring materials. Along this highway much remains to be done, and here is the place where your help is needed.

#### **A Crime to Not Protect Money.**

The people of West Virginia are honest and sincere but tonight trained vultures sit on the fence of destiny awaiting a chance to pick the flesh of inexperience from our helpless bodies and they will succeed unless we do our best to protect our interests.

To expend the amount of money now proposed to be expended without safeguarding it by a proper system of maintenance will be a crime and an act that will retard our future achievements. Therefore, it will be necessary for the protection of the tax-payers of this state, to revise our laws so as to bring the maintenance of our improved roads under one directing head.

Automobile tax should be in State Road Fund. To this end the first step should be to place the automobile tax into a State Aid Maintenance Fund, and the next step necessary to get a system of roads throughout the state will be to create a small state levy for the purpose of assisting weak districts in constructing their share of improved roads.

One thousand miles of roads properly located in this state will be within two miles of 50% of the population, while 4,000 miles of road rightly located, will connect each important and county seat and will accommodate 90% of the traffic of the state. But under our present system, it is doubtful when we will accomplish this result.

#### **County Courts Composed of Honest Men.**

We hear much said of our county courts, and I want to say tonight that I know personally every county

court member of this state, and as a whole a more loyal, honorable body of citizens can not be found. There is one condition found existing in this state that should make every West Virginia citizen hang his head in shame, and that is when we look about over our counties and find and select the most honorable citizens we can locate to fill the office of county court, and as soon as they are in office we begin to point the finger of suspicion and to do everything possible to interfere with their accomplishing the things we elected them to do. This condition needs to be remedied. The members of our county courts are not to blame, but the system we have followed is responsible for the conditions that exist and every member of this organization either by silence or action is a party to the system. Now as patriots worthy of the name of a great state like West Virginia, let us face about. We need a change in public minds. We need more knowledge of the real conditions as they exist and less talk of the actions of officials till we know the truth. I believe in publicity in public offices. The people should know how their money is expended, but they should seek and speak the truth.

#### **System Possible.**

We can bring to life and put into existence a highway system that in ten years will make West Virginia one of the most prominent states in the Union, the greatest country on the globe. As the mountains on the east of France have been her protection so some day may West Virginia's hills girded by good roads be the store house of liberty, the defense of America.

#### **System and Policy Needed.**

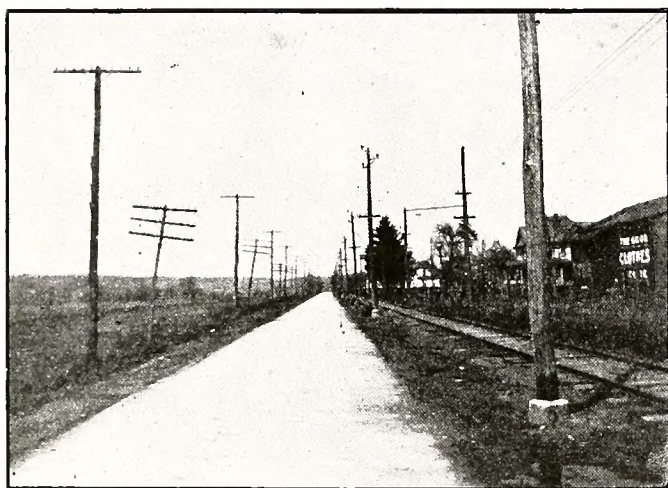
The time is at hand when we must look forward to establishing a real road system that will connect the county seats and principal towns and cities. We have gone blindly down the calf path to the turn and now need a policy that can be enlarged and expanded as the growth of the state demands. To secure this will require a Constitutional Amendment to authorize the

legislature to designate certain roads as state roads and then build them and maintain them as such. There are three ways of establishing a state system. One is by production levy, one by direct levy, and one by a state bond issue. The latter would require a constitutional Amendment and then a vote by the people on the bond issue.

#### Estimate of Cost.

To complete a county seat system connecting all of the important towns with a paved road would require \$60,000,000. This could be issued as a 20-year 4% serial bond which on a valuation of \$1,500,000,000 would require a maximum levy of 36c. on the hundred dollars and an average levy of 32c. on a hundred dollars valuation based on the above values being maintained, and all of the bonds being issued at once which should not be done, but a ten-years project should be mapped out and only six millions be issued each year—one half of which after the first year would be retired.

Thus the maximum levy would be on the tenth year which based on the above valuation, which would not



One of the Many Fine Roads Around Parkersburg, West Virginia

be correct as the wealth of the state will be greatly increased by that time. It would be safe to estimate the value of \$2,000,000,000 and the levy at 22c. maximum and the average at 19c. A 30c. direct state levy of a 15c. state aid levy for fifteen years will make possible a complete system of roads through out the state without a bond issue. This system of roads when completed could be maintained from the revenues derived from wheel tax and license on autos and thus we could, with the proper legislation, have a perpetual and permanent road system.

There is now a federal aid bill in a conference committee of Congress that will soon be reported and doubtless become a law which will necessitate a State Road System to avail ourselves of its terms. Our part will be approximately \$800,000 after taking of administrative percentage. A permanent road system is within our reach.

The advantages, the opportunities, fellow citizens, the responsibility is ours. What shall we do? What can we do? These are the questions we must answer and in answering these we will be liberating many persons who are imprisoned by lack of transportation facilities. We will be inviting into our midst thousands of home seekers and weary travelers to gather at our springs that bubble with curative waters for those seek-

ing release from the oppression of pain. A system of good roads in West Virginia means more to the state than any other one thing, and will be the lasting monument to the organization, the age, and the citizens that bring it about. No greater honor can we do to the name of the state than to set ourselves about the great task so that when the hand of progress writes on the eternal tablet the decision of years, each stroke of the pen will be a throb of consecration and each mark the influence of patriotic wisdom, watered by the dews of diligence, collected from the unfolding petals of truth.

West Virginia, the child of war, on this the 53rd anniversary of her birth, as the call of arms again comes to her citizenship to protect Americanism and the cause of liberty, calls forth not only her soldiers to battle and to die but her manhood and womanhood to live for truth and justice, because in dying ability is finished. In living truth is emulated. A birthday suggestion recalls that:

“Age is the heaviest burden men can bear,

Composed of disappointment, pain, and care;

For when the mind's experience comes at length,

It comes to mourn the body's loss of strength;

Resigned to ignorance all our better days—

Knowledge just ripened when the man decays.

When the backward course of life we view,

But looking forward, we behold the new.”

The sunset vale is radiant with the glow of experience but the night beyond is arched by the bow of hope resting on the pillar of faith supported with consecrated efforts—till the sun of a new day transforms the tears of the shadows into the sparkling dews of youthful activities. Come let us rise with the morning sun, to begin anew the work so well begun. Let us forget the sad struggle of the past and use our thoughts in planning smoother, firmer, and more enduring high-ways for the future, so that the next fifty-three years will reveal greater strides in permanent development than the past places before us tonight.

#### Inspection Trip Postponed.

In a letter to Judge W. T. Mills, of this Madisonville, Ky., who is vice-president of the Dixie Bee Line Association, J. C. Keller, secretary, announces the postponement of the proposed inspection of the Bee Line, set for Oct. 3, to some time in November after the election, the date to be decided upon later. His letter follows:

“I regret to advise that it has been found necessary by President Bosse to postpone inspection of the proposed Dixie Bee Line. The campaign incident to the election renders it impossible, we find, to have a full attendance of the vice presidents, which is necessary because of the business meeting scheduled for Hopkinsville, October 3. The tour will be made some time in November, after the election, if the roads are in good condition, and if they are fit to travel all officials will be requested to come to Hopkinsville for a big meeting. President Bosse is anxious to have the Dixie Bee Line constructed within the specified time, January 1, 1917, and with his characteristic energy will leave nothing undone to bring that about.”

St. Johns county, Fla., county commissioners have decided that in the future nothing but hard surfaced roads will be constructed. Much convict labor will be used and the state highway department will co-operate in the work.

# Necessity For Limiting the Loads, Size and Speed of Vehicles

By EUGENE W. STERN

Chief Engineer in Charge of Highways, Borough of Manhattan, City of New York

**D**URING the past year a great deal of damage has been caused to some of the best pavements in the Borough of Manhattan, City of New York, by heavily loaded steel-tired trailers hauled by motor vehicles. The destruction has been so rapid that it has brought to the attention of the authorities the necessity for limiting the loads on vehicles to be hauled over the city streets.

In recent years, there has also developed a greatly increased use of the motor vehicle, with increase in size, so that many of the streets in business sections of the city are becoming congested. Unless some limitation is placed upon the size of vehicles, this condition will continue to become worse.

As the weight and size of the vehicle increases, the question of limiting the speed also, must be considered, for it becomes evident that what would be a reasonable speed for an ordinary size vehicle of moderate weight would be detrimental to the public interests in larger and heavier ones.

## Damage Caused by Vehicles to City Streets.

The most damage seems to be caused by steel tired vehicles hauled by motor trucks, or trailers, as they are called.

The case in point is here given: A contractor's outfit hauling rock from the subway excavation on Broadway is made up of a tractor and trailer. The latter carries six large buckets, weighing about 15 tons. Its wheels are 41 in. in diameter with 8 1-2 in. wide steel tires. The load per inch width of tire is about 1400 pounds.

The springs on the front axle are spiral and on the rear, flat. They are very stiff, and this fact has unquestionably contributed towards the destructive effect of the wheel loads of the trailer. The jarring effect of the loaded vehicle is such that people along the route traveled complain about excessive vibration in their buildings.

The route traversed has been along west 42nd Street from 8th to 10th Avenues; north on 10th Avenue to 50th Street; west on 50th Street to the dump dock on the North River.

The age and character of pavements on the route is as follows:

Sheet Asphalt on concrete foundation, completed July 22, 1912.

Improved Granite on concrete foundation, completed Nov. 14, 1912.

Improved granite on concrete foundation, completed Feb. 26, 1913.

Sheet Asphalt on concrete foundation, completed Aug. 27, 1912.

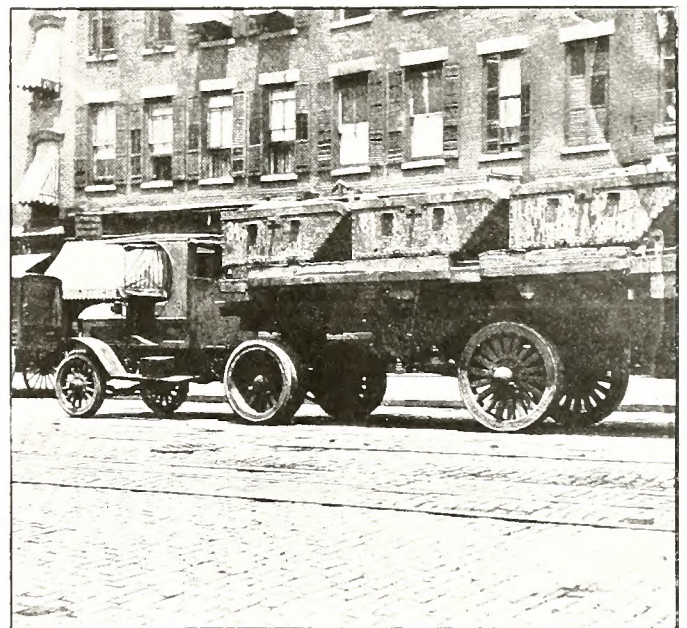
Improved Granite on concrete foundation, completed May 25, 1912.

It will thus be noted that these pavements are all substantially about four years old. They are considered among our best pavements, and have been laid in conformity with the latest specifications. Up to the time when the damage began to be done by the above mentioned trailers, no appreciable amount of wear had been

noticed beyond what ordinarily might be expected on thoroughfares with as much traffic as have the streets above mentioned.

The mischief has all been done in a very short space of time, (about nine months), and has amounted to 5400 yards of repairs on Granite (equal to 32% of the total area), costing \$6000, and 1900 yards of repairs on Sheet Asphalt (equal to 30% of the total area,) costing \$1900; whereas, prior to this time, the average cost per year of maintenance on the Granite was \$150, and on the Sheet Asphalt \$70.

The accompanying photographs show the kind of damage that has been done. On granite pavements the granite blocks have been literally crushed and ground into powder. In many cases the blocks were split.



Type of Heavy Trailer Used in City Streets

The granite used has given splendid service on other streets of the City. The Granite on 42nd Street, between 9th and 10th avenues, was quarried at North Jay, Me., and has a crushing strength of about 20,000 lbs., per square inch. The Granite used on 10th Avenue from 42nd to 50th street, was quarried at Rockport, Mass., and has a crushing strength of 25,000 lbs., per square inch. The Granite used on 50th street was quarried at Salisbury, N. C., and has a crushing strength of 40,000 lbs., per square inch.

On the Sheet Asphalt, the destructive effect has been equally startling. In some places it has been ground to small bits; in other places the wearing surface has been completely broken and cracked. It shows many depressions, waves and ruts and shoves.

In many cases the 6 in. concrete base has been shattered; however, in many other cases where the wearing

surface has been damaged, the foundation remains intact.

The speed of these vehicles was about 6 miles per hour in the day time, and at night it was considerably higher—12 and 14 miles per hour, and even 16 at times.

The question of restraining the contractor from hauling such excessive loads was submitted to the Corporation Counsel, and

#### Rubber Tires Not Destructive.

The effect of rubber tired traffic has been carefully investigated, and practically no damage has been caused by motor vehicles in which all of the wheels are cov-



Showing Damage to Granite Block Pavement

ered with rubber, beyond what is reasonable, although there are some types of heavily loaded trucks in use in the city. Our firstclass pavements show practically no additional expense for maintenance beyond a reasonable amount.

The manufacturers of motor vehicles have found by experience, that about 750 lbs. per inch width of tire is about all the load the rubber tire will stand, and this load, together with the resiliency of the rubber and the adequate springs on motor vehicles which good construction demands, seem both together to be the saving features in protecting the pavements, against undue wear, even under heavy loads.

The trailer, however, comes in an entirely different class. Not being rigidly connected with the vehicle having the engine and the more or less delicate mechanism, it need not have the rubber tires, nor the easy springs to prevent damage to the tractor, hence builders of these, who form a distinct class from the motor vehicle manufacturers, have allowed their fancy no restrictions in the designs of the tractors, their principal object being to provide a vehicle having the greatest tonnage capacity at the least cost, without considering the destructive effect on the pavement caused by the excessive loads, narrow steel tires, small diameter of wheels, and inadequate springs.

#### Danger to Country Highways.

It becomes evident therefore, that immediate action must be taken to protect not only the pavements of the cities and the municipalities immediately surrounding the cities, but also the country highways which are liable to be exposed to such kinds of traffic, or the taxpayers will be called upon to make very heavy payments to maintain their streets and highways, although

these may have been constructed in a thoroughly first-class manner and in accordance with the latest ideas.

It goes without saying that a vehicle that would break down the best kinds of city pavements in a short space of a few months, will cause much greater damage to even a firstclass country highway much more rapidly.

It would appear to the speaker that regulations properly framed to protect the pavements against the destructive effects of excessive loading in vehicles, should take into account the following factors:

1. That the wearing or damaging effect of wheel loads on pavements is a function of (a) the load; (b) the diameter of the wheel; (c) the width of tire; (d) whether or not the tire is of a resilient material such as rubber, or of steel; (e) the kind of springs.

2. That speed has considerable to do with the damaging effect of heavy loads.

An investigation of the laws and ordinances governing the weights and loads of vehicles, etc., adopted by eight states and 49 cities in the United States and Europe, goes to show that only a few laws have been drafted in accordance with modern conditions. It is surprising that even today in this country, certain com-



Showing Depressions Made in Granite Block Pavements

munities require that the width of the tire should depend on the diameter of the axle, regardless of the loading; others make no distinction in the regulations between a wheel large or small in diameter, while still others treat rubber and steel tired wheels the same.

Among the most up to date ordinances are the following:

#### Chicago, Ill.

Maximum weight of vehicle .....	15 tons
Maximum load on any one axle .....	12 tons
Maximum load on the wheel .....	6 tons
Maximum load per inch width of tire.....	1000 lbs.
Maximum length—	40 feet.
Maximum width—	8 feet, 6 in.

Speed—Compatible with safety, but not to exceed 9 miles per hour. Not to exceed 4 miles per hour when truck has defective tire which would cause injury to pavement.

Motor trucks must have rubber tires.

Trailers may have steel tires.

#### New York State.

Maximum weight of vehicle .....	14 tons
Maximum load on any one axle.....	9 tons

Maximum load per inch width.....800 lbs  
 Maximum width 8 ft. 4 in., except traction engines  
 which may have a width of 9 ft., 2 in.  
 Speed—Over 4 tons—15 miles per hour.  
 Over 6 tons—6 miles per hour with steel tires.  
 12 miles per hour with rubber tires.

#### State of New Jersey.

Maximum weight of vehicle.....12 1-2 tons  
 Maximum load per inch width of tire.....800 lbs.  
 Speed—4 tons—12 miles per hour (iron tires.)  
 6 tons— 8 miles per hour (iron tires.)  
 10 miles per hour (rubber tires.)

#### State of Pennsylvania.

Maximum weight of vehicle.....12 tons  
 Maximum load on any one axle.....9 tons  
 Maximum load per inch width of tire.....750 lbs.  
 Maximum width—7 ft., 6 in.; for busses in large cities 8 ft. 4 in.

#### State of Massachusetts.

Maximum weight of vehicle.....14 tons  
 Maximum load per inch width of tire—800 lbs. (except for hard pavements.)  
 Speed—4 tons—15 miles per hour  
 6 tons—6 miles per hour (iron or steel tires)  
 12 miles per hour (rubber or similar tires)

#### England.

The English have much the most complete and scientific ordinances of any that the speaker has examined.

Maximum weight of vehicle—12 tons.

Maximum load on any one axle—8 tons ( for trailers, 4 tons.)

Maximum weight of vehicle without load—5 tons.

Combined weight of motor car and trailer—6½ tons.

Weight on axle to be proportioned to diameter of wheel.

The load per inch width of tire (steel) shall be 840 lbs. for wheels 3 ft. in diameter; and an additional allowance of 9 1-3 lbs. for every additional increase in diameter beyond 3 ft.; and for wheels less than 3 ft. in diameter, a deduction of 18 2-3 lbs. per inch width of tire for every inch less in diameter than 3 ft.

Vehicles for military service limited as follows:

Weight of car unladen—6 tons.

Weight of car with trailer—8 tons.

Unit of registered axle weight with tires shod with cross bars—560 lbs.

Maximum width—90 in. for 3 tons; 90 in. for trailer.

Speed—Dependent on axle weight for iron tired vehicles 6 tons—12 miles per hour for rubber tires; Over 6 tons—8 miles per hour for rubber tires.

Should car unladen weigh more than 3 tons, speed is limited to 8 miles per hour.

If motor draws trailer, maximum speed is 5 miles per hour.

#### Width of Vehicles.

Unless some limitation is placed upon the size of vehicles, the tendency will be to make them larger and larger, until they will become a nuisance and congest the highways. This is now becoming evident in the city of New York, as well as in other cities.

In order to provide reasonable standing room on each side of a street and, at the same time, allow traffic to proceed in both directions, we are forced to limit the width which vehicles take up.

Many of our streets have roadways only 30 feet between curbs. It thus becomes evident that vehicles over 7 feet in width do not allow for two to pass, even using the utmost care.

While it is becoming necessary to widen roadways in this Borough, it is very difficult to add more than two feet to each side; a 30 foot roadway is thus converted into a 34 foot roadway. In this case, a 7½ foot width for a vehicle would be the limit.

In conclusion, the speaker submits that this subject is one of paramount interest to all cities, and that the



Where Heavy Traffic Has Ruined Granite Block Pavements

time has now arrived when the issues must be squarely faced.

It is hoped, therefore, that a thorough discussion of this matter will ensue, and that the result will be a crystallizing of ideas on this most important subject.

#### Patents Issued on Colloidal Bitumens.

United States patents have just been issued to Clifford Richardson on an improved "bituminous substance" and on the process by which this product is manufactured. Similar patents have also been granted in Canada, Great Britain, France and Italy. It is believed that these are the first patents covering a product and process involving the introduction of colloidal matter into bitumens of all types. According to the inventor he obtains "an increased degree of body or stability in these bituminous substances, by means of the addition to and intimate and uniform dispersion through the bituminous substance of a proper proportion of a substance in the state of a dispense colloid. The process consists in the introduction of clay in the form of a colloidal aqueous paste and combining this paste with the bitumen in such a way that when the water is subsequently driven off, the bitumen forms the continuous phase of the colloidal material.

The products resulting from this method of incorporating clay in colloidal form with bitumen has markedly different properties from products into which the mineral matter is introduced in the form of a dry powder. The products made by the Richardson method range all the way from materials resembling vulcanized rubber to plastic but at the same time very stable mixtures suitable for paving and many other uses.

The highway leading from Tamworth, N. H., to the home of the late President Cleveland and which was relocated by him is now being remodeled and beautified in splendid fashion. It will be dedicated to Cleveland and named in his honor.

# The Maintenance of Roads

By **WILLIAM F. COCKE**

**State Road Commissioner of Florida**

**T**HE DEFINITION of "maintain," as given by the dictionary, is "to support; sustain; defend; vindicate; continue." Therefore, a true form of maintenance is such that a road, once properly built, shall be defended, sustained and continued, so that it will be vindicated in the eyes of the public long after its builders have passed to their reward. Continuity and uniformity are essential to the maintenance of trans-state thoroughfares, and experience has demonstrated that the patrol system is the most economical and efficient means of securing these results. By continuity and uniformity I do not mean that the same type of surface should be used throughout the entire length of any road across a state, but that the several types of surface, best adapted to the several sections, should each be maintained for their full length in such a manner as to be kept up to standard efficiency throughout the entire year.

The practical application of the patrol system to through roads would mean that each road would be divided into sections of convenient length, depending on traffic conditions, but usually of about ten miles each, each section to be under the care of a patrolman. The patrolman would be provided with a horse and wagon and the necessary small tools. He would be expected to spend every working day going over his section, opening drains, repairing small defects and adding new material to the surface where needed. The material required for repairing the surface should be stacked along the road in piles. On gravel, marl and sand-clay roads the patrolman should be furnished with a long drag, and be authorized to hire an extra horse, to hitch beside the one furnished him, whenever necessary to drag any part of his section.

The patrolman should be under a division engineer, who should be responsible for the efficiency of the patrolman and for furnishing him with necessary material for maintenance. The division engineer should be required to keep accurate account of the cost of maintenance on each section under his supervision. His territory should be so arranged that he can inspect each section at least twice a month.

A county maintenance system must provide for the upkeep of the roads radiating out from the towns and shipping points, and also for the lateral or neighborhood roads connecting with them. Near the towns where the traffic is heavy, the roads will generally be improved, while those sections reaching back into the thinly settled neighborhoods will probably be maintained as earth roads for years to come. It will, therefore, rarely be practical to give any one road in the county system the same class of maintenance for its entire length.

For the heavily traveled roads adjacent to the towns a patrol system may be found advisable, but on the less traveled roads the gang system will be found adequate and more economical. Such a force should be equipped with a light camp outfit and be so organized as to cover at least twice a year all the roads which it is expected to maintain.

At the point where the patrolman stopped, the maintenance would be taken up by a gang system, and extended as far back into the country as the road con-

tinues to be a public highway. The gang system is especially adopted to the use of convict labor, and if properly handled convict labor should do the work at about half the cost with free labor.

In addition to the maintenance work done by the gang, there should be some arrangement whereby persons living on the county roads would operate a road drag whenever the roads became rutted. As there is generally only one time after each rain when conditions are suitable for dragging, no one man should be given more road than he can properly drag in one day.

No system is self-operative, and a county maintenance system is no exception to the rule. Highway maintenance calls for greater ability and a higher degree of intelligence than highway construction, and therefore if the county system is to be successful it must have at its head a man who combines executive ability with some technical training. It does not matter whether he is called county engineer or county superintendent, he must be a man who can plan and lay out his work for a year ahead, estimate what it will cost, and then do it in a workmanlike manner within the amount of his estimate. Such a man will probably cost from two to three times as much as untrained supervision, but he will save each month many times his total salary and give you a dollar's worth of work for every dollar expended.

In connection with the maintenance of state roads, I referred to the division engineer having supervision over the patrolman. Why should not each of the several counties join with the State and employ a competent man to supervise the maintenance of all roads in every county, each bearing its proportionate amount of his salary? With the State paying a part of his salary, the county could employ a higher class of man than if it alone had to employ that man, while on the other hand the State by joining with the county could secure more thorough supervision and materially reduce its overhead cost. Under this arrangement, the selection of the county engineer or superintendent would be made upon the joint approval of both the county and the State. He should be appointed strictly upon merit and be subject to removal at any time for inefficiency or neglect of duty. Complaint from either party to this agreement should be sufficient to cause his removal, but at the same time I would suggest that either should have the right to withdraw from the arrangement if they could not agree as to the fitness of the man in question.

No great object was ever attained by divided forces fighting along separate lines. Their lines of progress must necessarily cross at times and conflict with one another so that neither reaches the desired goal. To win there must be not only cooperation but coordination. Every unit must be so coordinated that there shall be no waste nor duplication of effort, so that every atom of energy put forth will exert its maximum power in the combined movement.

## The Permanency of Roads.

Investing money in the proper location, grading and drainage of roads is about the most permanently useful expenditure of public funds that can be made. Usually court houses are considered typical of such an

investment, but a well located road is serviceable for a far longer period. The court house is outgrown at the end of a quarter century; if it continues in use longer it must be remodeled and the public officials in it clamor for better quarters. But a road laid out on proper lines and grades serves the public forever, and on that account its location should be made by a competent engineer. Furthermore, even the local roads should be laid out with the same care, so that as the country develops they will improved with it and not require expensive purchases for new rights-of-way. Foresight in such matters will have valuable results within a comparatively few years in a country growing as fast as the United States.

Any county engineer, township road superintendent or road gang foreman who allows men under his direction to pile sod, brush or rubbish in the center of the road and leave it there to be beaten down by the traffic, should be "fired," the Iowa State Highway Commission recently stated. The commission is also of the opinion that any community which permits such road work to be done by any road crew on its highway deserves just what it is getting. There is no necessity and no excuse for such road building. If a mild protest to the authorities does no good, make the protest violent, the Commission advises. Sod and rubbish should not be thrown into the road in such a manner that it cannot be covered by good clean earth. Where such roads are already built, the road men should disk the sod and rubbish until it is thoroughly pulverized. The brush and weeds which cannot be cut up should be thrown off with forks, and then the road should be harrowed and dragged or shaped with a blade grader until it is in good condition. Road men will do the work

this way if a community demands it, but not otherwise. The roads of any community will be just as good as it insists upon, and no better, the commission has observed.

#### Road Improvement in West Virginia.

Of the \$33,000,000 of road improvement funds provided in the Southern Appalachian states in the 10 preceding years, 38% has been produced in West Virginia in the past three years, and 23% has been provided for in the past 12 months in West Virginia. This is a great showing for the new State Road Department. There being now \$12,968,500 authorized bonds of which \$12,088,500 has been voted since the department was organized.

The county court of Taylor has called for a vote on a \$100,000 bond issue in Knottsville District, November 7th and on the same date the voters of Lewis county will pass upon a bond issue of \$1,000,000.

The county of Preston has recently entered an order authorizing the beginning of work in Portland District under \$280,000 bond issue voted December 7th, 1915, which has been by a recent decision of the supreme court released for operation.

#### Georgia Roads Good.

That he encountered better roads in Georgia than in any state since leaving Michigan was the statement made in Waycross by J. H. Phelps, en route to Florida from Lansing. He has been making automobile trips to various sections of the United States and says in no state has he seen greater evidence of the good roads movement than in Georgia.



A Type of Road That is Helping Transform the Rural South

# A Million For Concrete

## Guilford County, North Carolina, Plans to Follow Up Mileage Built With a County System of Permanent Roads

**G**UILFORD is one of the North Carolina counties that is going after the problem of road construction in no half hearted manner. Already one of the leading counties in the state and South in the matter of improved highways, the progressive leaders of that community have started agitation to continue the work of building concrete-asphalt roads all over the county. The first proposed step is the issuance of a million dollars in good roads bonds. It is likely an election will be called, though such has not been done, but the propaganda is actively doing its work. The press of the county is practically a unit for a million dollars more in concrete-asphalt roads. Between Greensboro and High Point, two cities of the county, fifteen miles of concrete road with asphaltic surface have now been completed and is claimed by many to be the finest piece of road construction in the South. Whether such be the case or not, it is doubtful whether there is another piece of Southern highways that will beat it.

The following article by Norman A. Boren, of the University of North Carolina, a citizen of Guilford, sets out the resources of this county in road building and argues for the issuance of a million dollars more to continue the work of permanent road building:

It is my purpose to discuss as briefly as possible the advisability of replacing our present macadam roads with concrete asphalt. In endeavoring to show that such a step would be advisable it is necessary to point out the great development of the many phases of country life brought about by minor development of the roads in the county. From the results of these minor developments, such as the construction of macadam and sand-clay roads on education, transportation and valuation of property, it is easy for us to conclude that a still greater development in the construction of permanent roads would lead to a corresponding development of these aforesaid assets which are imperative to the advancement of any community or municipality.

From a collective point of view it is necessary for us in the beginning to consider the difference in public and private financing, so that our ultimate conclusion shall not be the outgrowth of a preponderance of knowledge on the subject of private financing, but shall depend equally as much upon our knowledge of public finance. Thus, in the first place, it may be noted that the individual whose primary aim in investment is profit will be debarred from many lines of expenditure, which a government may properly enter upon. This is explained by two reasons, to wit:

1. The individual must consider his investment as temporary in character, for his expectation in life is readily calculated, and on this account he is debarred from contemplating investments that run in perpetuity. The municipality, on the other hand, enjoys the expectation of perpetual existence, and consequently is at liberty to judge an investment from this point of view. Such a view is foreign to the individual who is constrained to judge every investment on the basis of proximate rather than ultimate results.

2. The individual finds it necessary to provide for quick returns from investment in order to maintain the credit of his enterprise, while the credit of municipalities does not depend upon the source of definite in-

come, but depends more on the consideration of ultimate rather than immediate gain.

Profitable investment has two distinct interpretations, that of the individual and that of the state. That investment of the individual is profitable which gives rise to money profits. The state on the other hand regards an expenditure as productive which results in the creation of those social, political or industrial conditions essential to the efficient development of private enterprises. The municipality and state exist for its citizens and its chief service is to provide conditions which will make the activities of its citizens more prosperous.

We will now consider the results accomplished by the minor development of roads in Guilford. I say minor development because I consider (with the people of Guilford) that any road improvement which falls short of concrete-asphalt roads is a minor improvement.

### Beginning the Work.

In 1903, the year which marks the beginning of progress in Guilford, we had not a mile of macadam in the county. Yet we were paying \$16,000 annually for the construction and upkeep of bridges and old fashioned red dirt roads. In this year of 1903 it was proposed and, after much opposition, carried that we should vote \$300,000 five per cent. bonds, running 30 years, and to use the proceeds of their sale in building macadam roads, applying the tax we were then paying for the old type of roads and bridges, to the payment of the interest on the bonds.

The result was two-fold, in that since that time we have built in the county approximately 120 miles of macadam, 150 miles of sand-clay and 20 miles of concrete-asphalt roads. The other result is that these greatly improved highways which revolutionized transportation resulted in the creation of those social, political and industrial reforms which have been essentially instrumental in the development of private enterprises in the last 12 years.

These reforms have resulted in an increase of population from 40,000 in 1903, to more than 70,000 in 1915. During the last census period 10 counties in North Carolina suffered an actual decrease in population; one county of this district losing one-eleventh of its population in that period. Was this due to excess of death over birth? Not a bit of it. It was due to the fact that Guilford, the county of opportunity, was so near and furnished such good means of transportation that it was only a trifling matter to take up their goods and move over the smooth roads of Guilford to more prosperous homes. During this period in 43 other counties of the state, the rate of increase was less than the natural increase due to excess of birth over death. Guilford, during this same period, showed a greater percentage of gain than any other county of the state.

This increase in population was naturally followed by a similar increase in the price of farm lands. The average taxable value of farm lands per acre in Guilford in 1903 was \$7.16, while in 1915 it was \$12.36. The total taxable valuation (both real and personal) in 1903 was \$9,955,238. In 1915 it was \$33,629,469.

The results are that with a tax of only 25 cents on the

\$100, for roads and bridges, we are able to raise, by virtue of the great increase in property, the sum of \$85,000 annually, for road and bridge construction; whereas, in 1903, when the total valuation was only \$9,955,238, we were only able to raise \$16,000. From this sum of \$85,000 must be paid the annual interest of \$15,000 on our road bonds, leaving \$70,000 annually for road improvements and upkeep, less that amount the commissioners may put aside for the payment of the old bonds at their maturity.

#### Effect on Education.

The effect of the road improvement on the educational facilities of the county is as follows:

In the last 10 years, from 1906 to 1916, the value of rural school property of the county was \$64,825. In 1916 it was \$173,500. The number of rural school libraries, the number of volumes in these libraries, the number of teachers of all classes and the number holding first-class certificates in every instance have increased nearly 300 per cent. since 1903, while the average number of school days increased from 85 to 131 days during this period.

From these figures I think we might easily conclude that good roads themselves do not come alone, but with good roads come good schools, better farms, and a general industrial revolution throughout the county, increasing its capacity to perform all the functions delegated to it.

The above are results which accrued directly from the minor developments of roads. From the shadows of the past and present we may now draw our light of the future. This light of the future was first presented to the county when the commissioners of the county in joint meeting with the chamber of commerce, enunciated the plan of voting \$1,000,000 with which to replace the old macadam roads of the county, which have disintegrated to such an extent that they would only be of value as a base upon which to construct this concrete asphalt. Their great value in this respect is clearly shown by the fact that this macadam by serving as a base saved the county \$40,000 in the construction of the highway leading to High Point. Further disintegration, however, will make them void of this the last quality, which makes them possible. But as I see it there is to be no further disintegration, for the people of Guilford, on fully understanding the case, will cover these macadam stretches with concrete asphalt, which will stop their weathering for all time.

The sum of \$1,000,000 sounds big, but compared with the resources of the county, it is not a sum exceeding that which we can conveniently use; nor is it larger than that which we should use.

When we voted the \$300,000 bond issue in 1903, it was at that time one-thirtieth of the total taxable property in Guilford. In 1916 by voting this \$1,000,000 we will only be voting that amount which is one-thirty-third of our assessed wealth. It was determined in 1910 by the United States census bureau, that our farm land was assessed at only 49 per cent of its real value. This being the case we may readily surmise that we are worth as a county at least \$50,000,000. With this backing we should not fear to launch this expenditure which will involve that amount equal to only 2 per cent of our wealth.

We are at present receiving \$85,000 tax for roads and bridges, \$15,000 of which goes to pay the interest on the \$300,000 bond issue of 1903. The remaining \$70,000, as I have previously stated, if left with the

commissioners for a sinking fund and for such improvements as they may deem necessary.

By taking out \$10,000 of this \$70,000 each year we will have on the maturity of the bonds the \$300,000 required to settle. This leaves \$60,000 for improvements. Now take \$10,000 more out with which to maintain the sand-clay roads of the county. This leaves \$50,000, the exact amount required for the payment of the interest on the proposed bond issue of \$1,000,000. To my mind this will be the most effectual use of the \$50,000, and I am sure that those people of the county who do not already maintain this view, will reach this conclusion before or by the time it is placed before them for a final decision. By building 90 miles more of concrete-asphalt roads throughout the county we will greatly decrease the danger one now encounters on the much congested highway between High Point and Greensboro. Not only will they ensure safety throughout the county, but by distributing this road we will eliminate prejudice which some sections now hold. The results of this major improvement will be a still further step towards the revolution of transportation and will create those reforms which shall be more instrumental in the development of private enterprises in the future, than the minor developments have been in the past.

There is no reason why this major development should not lead to as great an increase in population in the county as that which followed the improvement of 1903. If such be the case at the end of the next 12 years our population will have doubled. And unless nature, which has been the guidepost of man since the beginning of his existence, utterly disregards all her precedents, we will have a total assessed valuation of \$100,000,000 at the end of the next 12 years, instead of the \$35,000,000 at present. Here at the present rate of 25 cents on \$100 is where our sinking fund will make known itself and secure the safety of the investments.

#### Fine Scenery Near Bristol.

In paying a high compliment to the scenery around Bristol, L. B. O'Hara, a prominent citizen of Yorktown, Va., says that the scenery found in the Adirondack mountains is not to be compared with the view obtained from Chestnut ridge, between Bristol and Kingsport.

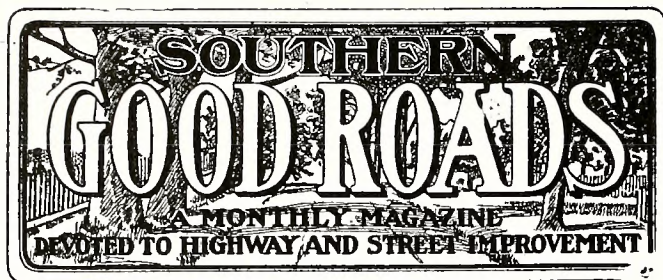
"The roads that I have passed over in the vicinity of Bristol," said Mr. O'Hara, "reflect the character of the community. Your roads will compare favorably with any of the highways around Yorktown and bespeak a high social plane for the people of this district, who, as I understand, have acquired these wonderful pikes with no little effort.

"For a number of years I lived in New York state at the foot of the Adirondack mountains but nowhere that I have ever been have I found scenery to compare with that around Bristol. The view from Chestnut ridge is superb and is especially fascinating at this time of year.

"I am free to predict that when the roads in this section are connected with those of the north, the tourist travel through this part of the country will surpass that of any state in the nation."

Mr. O'Hara was especially impressed with the progress that had been made by the good road boosters in the past two years and said, "it is evident that whoever is at the head of your good road crusade, is built for the job."

Legislation along the lines of good roads building featured the meeting of the Louisiana Good Roads Association, held at Shreveport on Nov. 3 and 4.



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### THE GOOD ROADS SENTIMENT.

Perhaps no other feature of civic reform or improvement of recent years has attracted so much attention as has that of road building. All over our broad land, from ocean to ocean, from the gulf to the lakes, the wave of enthusiasm is rolling. The people are realizing that they must have better roads, and the machinery of government in its taxing capacity is being ever more and more strained to meet this demand.

But while there is a certain responsibility resting upon the State in the maintenance of our highways, we are in danger of forgetting that an even greater responsibility rests upon us, individually, as citizens. The reason why we sometimes lose sight of this responsibility is that we have gotten into the habit of working out all such matters through the medium of taxation. If we want a new road opened, we levy a tax. If we want an old road macadamized, we tax some more. Is a bridge to be built? We impose another tax. We tax and we keep on taxing, and this, regardless of the fact that we all know, that the hardest money to give up is that which is paid in taxes. Many a man will come to town and spend in a day enough to pay his yearly taxes and think nothing of it. But he will sweat drops of blood, as it were, when the tax gatherer rounds him up.

We depend too much upon taxes. We would depend

more upon individual and personal effort. A lively neighborhood interest in good roads is worth all of the taxes you can wring from unwilling pocketbooks. A determination by a united citizenship of a county that their roads shall excel is worth more than all of the road commissioners in existence. Road commissioners work through devious ways to reach their object. The united sentiment of a people works direct to the object. It determines what is wanted and then takes the most direct route to accomplish its ends.

Do you favor better roads in your community? Then go to work and arouse a healthy community sentiment that will demand them. When that is accomplished good roads will be the result.

### NEW TRAFFIC PROBLEMS IN SOUTH.

It has become all too evident that the increase in traffic on our Southern highways is running away from the regulations imposed by our State laws. Many of our principal roads are now bearing a traffic that is far beyond anything that might have been imagined for this period just a few years ago. On a recent stretch of 30 miles of the Southern National Highway a motorist counted an even 200 cars that passed in the opposite direction, during the trip that consumed little over an hour. It is safe to say that 400 cars were on that stretch of road within less than two hours. Other points on this highway sometimes bear a motor traffic that at times averages two or three cars to the minute. There are many other roads in the South that now bear this large or larger motor traffic, not taking into consideration the large number of horse drawn vehicles.

This brings the lesson home to us forcibly. There must be regulation. Too many lives are being lost on account of reckless driving and too much property is being destroyed. In many places there is being an utter disregard of the effect of excessive traffic on the wear and tear of the roads. The "road hog" is in the heyday of his glory, because the arm of the law has not been extended with enough force to control him. Instead of arguing whether the town of Goose Neck shall be incorporated, our lawmakers may well find a task for their careful consideration in the matter of traffic regulation on public highways. A number of states have already laws that would be adequate for protection of travel if there were any machinery for their enforcement. It is doubtful whether 1 per cent of the violation of state traffic laws is taken note of, but in most instances it is because the states have not provided proper police machinery. We have come to the stage where it is just as important that our public highways be policed as that protection be provided on the streets of our cities. The good road and automobile have largely obliterated the town-country line.

Carlisle, Ky., is laying claim to one of the best local highway systems in the state, as the result of spending \$125,000 in bond money, with state aid.

### Building Roads by System.

The plan of construction and maintenance for the future in Davidson county, N. C., has just been outlined following the expenditure of a \$300,000 bond issue. The surfaced roads are divided into first and second class, the principal highways being in first class and the other surfaced roads in second class. All unimproved roads are in the third class. On the first class roads a patrolman will cover about seven miles, while about twelve miles is cared for on roads of the second class, the amount of traffic determining the maintenance required. The patrolmen have been furnished blanks and they must make monthly reports of all work done, class of work and expense to Mr. R. T. Brown, engineer-superintendent, and he must approve accounts before paid by the board.

For the roads of the third class the county has been divided into four sections. A foreman and two helpers will be kept at work all the time in each of the four divisions and will be provided with two teams of mules, plows, drag scrapes, road machine and other necessary small tools. As much of this work as possible will be of a permanent character and the roads at places will be relocated by the engineer. In many sections the citizens are offering to co-operate by furnishing teams, free labor, topsoil, etc., thus enabling their section to get permanent roads quickly. The engineer will make frequent trips of inspection and all work done must be reported to him. In addition to these four permanent forces, the large and well-organized county chain-gang force will be kept at work building surfaced roads. The advantage of improving these cross country roads is that it gives a better road to the people, it is well located by an expert engineer and can be more easily maintained.

Of the roads of first and second class, the patrolmen on the 25 miles of the Central Highway are under supervision of a U. S. Government engineer and report their work through him. The Central Highway has been marked through the county by means of six inch bands of blue, white and blue around the telephone poles along the way. The National Highway to the Forsyth line will later be marked in red, white and blue bands. It is contemplated also to mark the Boone Way from Lexington to the Yadkin river in suitable colors.

Mr. Brown is taking great pains to drill the patrol and maintenance men in their duties and make them as efficient as possible. Nothing short of the best maintenance system in the state will satisfy the engineer-superintendent.

### Right of Way and Headlights.

Right-of-way and glaring headlights are the two things which stand out ahead of everything else in the uniform traffic problem, according to Chairman O. I. Yellott of the A. A. A. Legislative Board, which has taken up this large subject in a determined effort to bring about a country-wide understanding.

Evidence that all of the states are interested in this plan of the organized motorists is apparent in the letters being received by Chairman Yellott. From Washington comes this comment by Secretary of State I. M. Howell:

"The American Automobile Association is certainly on the right track now, and if you will compile something that can be made uniform throughout the United States I know of no reason why it could not be passed in each one of the several states. Send us something

and we will try and put it in the motor vehicle code at the next session of the Washington State legislature."

From Maine, State Highway Commissioner P. J. Deering asserts that the Pine Tree State, particularly because of its large number of summer road visitors, wants uniform regulations such as he expects will be proposed by the A. A. A. board. Incidentally, Mr. Deering is president of the Maine Automobile Association.

President C. H. Ellis of the Louisiana Motor League admits that "way down in New Orleans—to which old city the persistent motorist is finding his way—there is need of uniformity in the handling of traffic, while from many other sections of country the communications make clear that the time has arrived for comprehensive attention.

To the recent meeting of the A. A. A. Executive Board came an invited committee from the Society of Automobile Engineers, which has been at work for some time on the subject of glaring head lights. While the engineers have not come to a finality upon all the details, their spokesman supplied information which would seem to assure a complete answer in the comparatively near future.

In the matter of right-of-way, the consensus of the meeting was in favor of a plan which would provide that a vehicle give way on the right or on the left to an approaching vehicle, eliminating any north-south versus east-west regulation or giving through traffic on the main arteries the advantage. In New Jersey and Maryland, the state law now includes a right-of-way to vehicles approaching on the left, while in many states north-south traffic has precedence over that going in the other directions.

### What Ten Years Has Done.

There has been a remarkable improvement in the public roads situation throughout the country. The increased use of the automobile has increased the demand for good roads, naturally, and the educational work that has been pressed without ceasing in many ways and through the most influential agencies has had the effect of enlisting thousands of responsible men in the enterprise, which had for its spokesmen only a few years ago a handful of zealots, or "nuisances," as they were sometimes called, who went about the country telling even the oldest settlers how it might be possible to improve their living conditions by the simple expedient of building good roads that would connect them in a way with the outside world.

Ten years ago there were only 48,000 registered motor cars of all sorts in the United States; last year there were 2,445,664. This was an increase of 5000 per cent.

In 1904, approximately \$79,000,000 was expended by all the states, counties, districts and townships in the United States for road purposes; ten years later the expenditures by the same units for the same purposes amounted to nearly \$225,000,000, and in the year 1914 alone \$43,000,000 was expended. In the present year it is estimated that \$300,000,000 will be expended. The United States office of public roads and rural engineering has recently assembled some very valuable information showing by groups of states the great increase that has been made in the expenditures upon the public roads and bridges during the 1904-1914 period. The sixteen Southern States, including the State of Delaware, covered in one of the groups embraced in the general study show an increase in revenue for road work of 142.5 per cent, or about 14 per cent the year.

# Needs in Local Road Improvements

By D. O. THOMAS

Highway Superintendent of St. Clair County, Illinois

**I**F a business man handled his private business in the way we've been running our road business, he would go broke inside of a year. It is lucky for us that we can't break the tax-paying public: for no matter how lax we are, the money continues to come and the taxpayers continue to pay. Is it not our serious and bounden duty to spend this money wisely and in a scientific and business-like manner?

In my county, we spent \$100,000 on our roads and bridges, through our highway commissioners, and as yet I have been unable to find out what it actually costs each township a year to maintain its wooden bridges and culverts and its steel bridges, or what it costs per mile per year to grade roads or to drag roads. One township did know what it cost to drag roads, viz: \$1.35, which, however, represented the total for the year spent for dragging; yet even there I could not reduce it to mileage unit cost basis.

The hardest job I have is to persuade some of our township officials to keep an adequate set of books. I have even been told by one commissioner that his township did not need to keep books, because everybody was honest in that particular township. I would pity this particular commissioner if somebody accused him of being dishonest and he had no records to fall back on to prove his honesty. This latter case actually happened in another township, where a thoroughly honest man, a commissioner, was accused of paying out money to somebody for something that was not done, and he had no record or receipt at all from the man.

I would like particularly to call your attention to the fact that I said "to keep an adequate set of books." Statistics and figures are all right, but if they are not the right kind of statistics and figures, they are not worth the paper they are written upon. For instance, I find that most of the books simply show that John Jones or Bill Smith had so many hours to their credit for hand labor or team labor. That tells us nothing. What the people want to know is what John Jones did with his shovel, or what Bill Smith did with his team; how long it took him to do it, and what it cost to do that particular kind of work. This is what we call distribution of accounts and unit costs.

If you follow this kind of bookkeeping you will soon find where the leaks are. Take one example: Suppose we knew that we were spending \$500 a year patching up a lot of wheezy, decrepit, old wooden culverts and bridges, and that when we were through sweating and patching and spending our \$500 we still had nothing, and that we were still lying awake nights worrying that some 20-horse engine was going to break through one of these so-called bridges and fall on top our neighbor and kill him. Five hundred dollars is 5 per cent interest on \$10,000. Would it not be good economy and wise business to borrow \$10,000 and replace a number of these old culverts and bridges with modern concrete structures that would safely carry the loads imposed upon them and give us something for our money, rather than pay the interest on that amount patching around and getting nothing? Concrete bridges cost money, but I have yet to have anyone prove to me that they are not an economical investment.

You will at once say that all this sounds very well,

and that you agree with me, but "Get us the money; our income is limited and the people will vote down any bond issue that we might bring up for these things." I cannot agree with you on this latter point. My own experience in my own county shows that the taxpayer is a wise business man, and if he is shown that the money is being handled wisely and that he is getting somewhere near value received for what he pays, he will vote right.

## Maintaining Macadam Roads.

What to do in any kind of construction work when one does not have enough money to do the best thing is a very trying problem, particularly when the work is for the public, which expects the highest class of results even when it pays for only second or third class. This is particularly true in road improvements. In Rhode Island, for instance, there are many miles of old-fashioned macadam roads built without bituminous material. They withstood travel well until motor vehicles became so numerous that a different kind of construction became necessary. The Board of Public Roads has not had enough money to reconstruct the roads with the most durable but expensive classes of material and workmanship, and so it is doing the best it can with what it warns the taxpayers are measures of only temporary avail. When one of these old macadam roads is badly worn, the board reconstructs it by first placing three or four inches of broken stone on top of the old surface and rolling it thoroughly. This stone is then covered with heavy road oil, which is covered in turn with sand, and then the road is rolled again. Chief Engineer Patterson says of this work: "We felt that something must be done to alleviate conditions, and we did what we believed to be the only thing we could do under the circumstances. We have received many flattering comments from the traveling public upon this work, but we have endeavored to make plain our stand that we considered the work of a temporary nature." The board does not fall into the danger of terming such construction "permanent" when it is really only serviceable for a few years.

## Texas County Organizes.

The Hale county branch of the Texas Good Roads Association has been organized with seventy four charter members, each paying a small initiation fee. E. E. Ross was elected president, J. M. Waller, vice president and A. G. Hinn, secretary-treasurer. The organization is a part of the general movement to secure for Texas the apportionment of the \$5,000,000 national good roads apportionment made by the Sixty-Third congress. Plainview is on the National Highway from Canada to the Gulf and the Puget Sound to the Gulf Highway.

Manager J. D. Clarkson of the Jefferson Highway Association has completed a trip over that 2,000 mile route and finds that work is going forward with such rate that its completion only appears a matter of months. The Southern states on this route are displaying encouraging activity.

# Only Eleven Per Cent of Roads Surfaced

**T**HERE are 2,333,000 miles of public roads in the United States, of which only 262,400 miles have any kind of surfacing. In other words, nearly 89 per cent of our roads are of dirt, and it will be a quarter of a century, probably, before this percentage is reduced to 75.

The great road problem of the United States is to grade, drain and maintain these roads so as to make them of the best practicable use at a minimum annual expense. Some progress along these lines is evident, and in some sections very satisfactory earth roads have been built and are maintained in good condition, except for a few weeks in spring, by intelligent dragging.

Another method of maintenance, originating in California, is now being tried with more or less success in a number of the central states. This is oiling the roads. Its purpose is to suppress dust, for in so doing the road surface will remain smooth longer than when the road is dusty, and there is less mud formed in wet weather. But oiling roads has to be done intelligently or it will make conditions worse instead of better. It is useless to oil a dirt road which is not thoroughly drained and properly graded. It is a waste of money to oil a road which does not have a smooth, hard surface free from dust. If the surface is uneven oil collects in shallow depressions and softens the surface so that after the first heavy rain the travel tends to make mudholes at these places. If there is dust on the road the oil combines with the dust to form a sort of hat, which the travel over it quickly breaks up into large flakes or scales.

## Surface is Bound.

If the road is in proper condition to receive the oil, and the right kind of oil is used, the oil percolates into the pores of the earth for a depth of several inches, sealing them with an asphaltic binding material which unites the surface into a tougher mass than the original surface. The oil cannot make the road any harder, for only stone or gravel will accomplish that, but it will prevent the displacement of the earth particles under any loads which an earth road is adapted to carry.

If the oiled surface is immediately covered with a thin layer of clean, hard sand, the travel will not disturb the oil and travelers will suffer less in convenience. The right kind of oil should be used, for there are some kinds which act as lubricants and ruin a road instead of improving it.

This kind of maintenance of earth roads is proving so successful in the central states that the Illinois state highway commission has recently issued for free distribution a profusely illustrated bulletin telling how to do it and what things to avoid doing.

## Slag Also Makes Good Road.

The chief by-product of the manufacture of iron in blast furnaces is slag. An enormous quantity is produced; for every hundred tons of iron made, in such a furnace from forty to sixty tons of slag are also made. It accumulates in great piles and its utilization is a convenience to the ironmakers. It is a hard, dense, tough material, which railway companies have crushed and used for many years in ballasting their tracks. For a quarter of a century it has been used in road building, but until quite recently very little was ever said of this work.

It has been in service now on a large scale for sever-

al years in Ohio, Pennsylvania and New York, and to a smaller extent in West Virginia, Illinois, Michigan, New Jersey, Delaware, Maryland, Alabama, Georgia and Mississippi.

The experience with it has not been so long as with different classes of rocks, but it has been so satisfactory that the material is recognized in the specifications of some of the leading state highway departments. Furthermore the United States office of public roads built an experimental road of slag at Youngstown seven years ago and the reports of the annual official inspections of the road made since it was laid are convincing testimony of the value of this by-product that has so long been regarded as of very limited utility.

## Six Million on Lincoln Highway.

A force of men is now at work on the Lincoln highway, near Glidden, Ill., between Carroll and the East end of the county, widening the grades and bridges and straightening the road.

This is a small part of the improvements on the route of the Lincoln highway between New York city and Salt Lake, which will cost \$6,000,000 in round figures, according to H. C. Ostermann, field secretary of the National Association, who has just driven over this section of the transcontinental road.

Various cities along the route of the Lincoln Highway are adding to the attractiveness of the drive within their borders by erecting illuminated markers for the benefit of the tourists at Glidden.

An idea of the steady flow of tourists which the Lincoln Highway is carrying into the East is furnished in a report just compiled by Horace E. Fine, New Jersey state consul of the Lincoln Highway Association of Trenton. During the month of July, Mr. Fine kept an accurate record of Lincoln Highway tourists stopping at one of Trenton's most prominent hotels and his figures disclose that at this one stopping place, there were 210 Lincoln Highway travelers who spent from one to five days in the city. Mr. Fine's data was compiled from printed registration slips signed by the Lincoln Highway tourists when they registered and shows that motoring parties used the Lincoln Highway in coming from all points in the West to New Jersey, and were bound for the various resorts and summer places in the East. With the registration taking in all of the hotels and stopping places in Trenton, it is safe to assume that the number of visitors arriving over the Lincoln Highway was greatly in excess of the number indicated.

Tourists on the Lincoln Highway this season have been compelled to make a detour between North Platte and Gothenburg, Nebraska, due to the construction of the new \$50,000 bridge over the North Platte river, at North Platte. The bridge is a splendid and artistic structure designed to accommodate the heavy traffic, which is increasing yearly on the Lincoln Highway, and is now complete. The county commissioners are at work finishing the approaches to the bridge and material improvements are to be made on the route of the Lincoln Highway itself, between this point and Gothenburg. The detour which took the tourists along the south bank of the North Platte river will no longer be necessary and 18 miles of travel will be saved to the traveling public.

# Oklahoma's Central Highway

**T**HE central route of the proposed Ozark Trail passing through the counties of Grady, Caddo, Kiowa, Greer and Harmon, is the "high-gear" route running through southwestern Oklahoma. Stress is laid on the fact that the entire road from Oklahoma City to the connecting point with the Gulf-Colorado highway at Headly, Texas, is devoid of steep hills.

There are long, level stretches, well drained and above all known high water marks. The close proximity of material with which to hard-surface the entire roadway, interest centering in the project, road-building equipment on the ground to build the highway, and the perpetual maintenance of the highway after completion and the mileage covered between Oklahoma City and Amarillo, make the route ideal.

In scenic splendor the central route offers to motorists a chance to traverse the picturesque "new country," the garden spot of the state, see the famous old Kiowa Indian agency at Anadarko, the Rainy Mountain Indian school in Kiowa county, the Wichita mountains, solid granite hills, rich in ancient lore, the pretty little town of Granite nestling at the foot of the Wichita mountain range, with its sulphur springs, and scores of ideal camping grounds, the state reformatory at Granite, and on to the historic town of Mangum in the kingdom of Greer and once claimed by Texas.

Running diagonally from Oklahoma City to Chickasha, the proposed Central trail goes west to Anadarko, and from there to Hobart.

The ridge road, running south from Anadarko six miles, and then due west as the crow flies to Hobart, offers no advantages over the river route, paralleling the Washita river, above the high water mark and taking in the towns of Washita, Fort Cobb, Carnegie, Mountain View and Gotebo. Both routes lay claim to the same mileage but for a scenic route the river road touches the historic old Cobb fort, named after Cobb creeks. In the early 50's Fort Cobb was garrisoned to protect the southwest frontier and at the outbreak of the Civil war the garrison was marched to Fort Leavenworth. The site is an elevated tract in the center of about 100 acres, oval and flat gently sloping in all directions, with Cobb creek eighty rods away. The old fortifications extend to the stream, where the water supply was protected.

The central route offers the shortest mileage to a connection with the Gulf-Colorado highway. An inspection of the state highway department's map, which shows every section of land, the course of every highway in the state, and a similar map of Texas, shows that a crow could fly from Oklahoma City to Amarillo, Texas, by traversing a distance of 251.7 miles. The Rock Island railroad collects fares for 273 miles between the two points. If a man should start at the Lee-Huckins hotel, Oklahoma City and walk south of Broadway eighteen miles, then turn and walk due west a distance of 251 miles, wading the South Canadian four miles west of Norman and passing through Carter and Texola, he would be in Amarillo, Texas.

## Prisoners Build Roads.

Southwest Oklahoma has been building good roads since statehood, with the county prisoners. For nearly nine years Kiowa county has been averaging in construction nearly five miles of good roads per month. Since the automobile tax has been available the county has been making road dragging contracts and maintain-

ing these thoroughfares. Everywhere over the state the county is pointed to as the one building model county roads.

The announcement from Oklahoma City last August that the good roads committee of the chamber of commerce was going to send a delegation over two of the three proposed routes for the Ozark trail through southwestern Oklahoma, thoroughly aroused the dominant good road advocates, and at present every county along the central route is active in building the roadway. The first meeting was held in Hobart, August 17, and delegations in automobiles were sent to points east and west of here to create enthusiasm, and arrange for the reception of Floyd Thompson, H. A. Douglas, M. S. McEldowney and J. P. Martin, the Oklahoma City Chamber of Commerce committee. August 21, Mangum sent delegations to Hollis and Wellington. August 23, Mangum road advocates went to Sayre to meet the trail committee, and that night held a big meeting at Mangum with fifty or more from Hobart present and decided to organize the Southwestern Oklahoma Ozark Trail association at Hobart, the next day. Thursday, August 24, the organization was perfected.

Activities were maintained in the meanwhile and on September 6 the final organization was perfected at Mangum, at which time it was decided to mark the central trail with a white collar, bordered at the top and bottom with a yellow stripe. September 20 was designated as good roads day along the entire central route, and on this date a holiday was declared in the leading towns, and practically every mile of the road from Chickasha to Wellington, Texas, was put in first-class condition, and the work of building a permanent road is progressing steadily, both with the aid of the different boards of county commissioners and from private subscriptions.

## Good Natural Roads.

The central route offers the best natural roads to start with reaches the best agricultural section of Oklahoma, has the unqualified indorsement of the several boards of county commissioners, is delightful in its scenery, every county is equipped with new and modern road building machinery. The central route traverses a country where sand clay, gravel pits and granite quarries and crushers will furnish an abundance of hard surface material to place on the road, making it a permanent national highway that cannot be equalled in any part of the great Southwest.

## Alabama Good Roads Association.

The 20th annual session of the Alabama Good Roads Association will meet in Birmingham on November 15th-16th. This promises to be one of the most interesting and largely attended meetings ever held in the history of the association. Hon. J. A. Rountree, Birmingham, Ala., is secretary.

The town of Lakeland, Fla., will come up to the work being done by the county, through building fine streets to meet the loads leading to its corporate lines. Asphaltic surface will be used. The county is spending a million and a half in road building. Many towns in the country are criticised because their streets are much worse than the roads leading to town.

## Teach the Rules of the Road

**T**HE SUBJECT of accidents upon public highways, always an interesting one, has for some time past been receiving much attention, declares F. M. Hugo, New York secretary of state. Of course, any kind of locomotion, whether by land or sea or in the air, has its peculiar dangers, but as the public highway is so intimately and continuously connected with everyone's life, accidents upon it receive the largest share of attention. To begin with, every good driver upon the road, whether of horses or motor cars, should thoroughly grasp the fundamental fact that the pedestrian has in some places greater rights, in others an equal, and in still others an inferior right on the roads in relation to wheel traffic, and he is supposed to take reasonable care of himself and to see that he does not recklessly endanger himself and others.

There are dangers which the motor car driver incurs every time he travels along a highway which is not in the nature of common ones. As generally understood, common dangers, for instance, include the chance of collision with other vehicles at crossroads, of skidding on a slippery pavement and many other well-known risks which vary according to the traffic, the condition of the road and weather, and many other circumstances which need not be considered. The driver of a motor car, however, who aspires to a clean record in the matter of accidents has to be more than ordinarily alert. He has to exercise in a special degree the quality of forethought and train himself to calculate beforehand what is likely to happen under certain circumstances which may at first appear unlikely.

A danger to which vehicles meeting and overtaking are especially liable occurs when small children are holding on the rear end of wagons. Talking at the top of their voices, these young folks often lose sight of the fact that other vehicles may be overtaking and passing them. A boy, perhaps, drops his cap and suddenly relinquishes his hold to recover it. At that moment, perhaps, another vehicle is passing, and before anything can be done, or without any blame being attributable to the driver, the lad is knocked down and injured.

Of course, in such a case the fault lies primarily with the child. But motorists must treat children in all cases as irresponsible and careless. When children's feet are seen underneath a vehicle to which they are clinging, utmost caution must be exercised and either an extra wide space allowed when passing or the motor car slow down to such an extent that an instant stop can be made.

Accidents are reported from time to time as happening to deaf, old and infirm people, who, while out walking probably in the middle of the road have not been able to hear the warning of the horses' hoofs or the motor horn; in such cases they are often run over and perhaps killed. These are accidents hard to avoid because one cannot presume that every pedestrian is deaf. Those whose hearing or eyesight is impaired are always sources of incalculable danger on the highways, not only to themselves but to others. More lives may be endangered in trying to avoid an accident at the last moment than would be involved if the risk of collision with one deaf person was incurred.

The fact is that in these days of rapid and constant locomotion the highway has become a very dangerous place for those not in possession of their full faculties

in every sense. For nearly 60 years past, that is from about 1840 to 1900, the main highways were more and more deserted, the railways taking the whole of the long and a great portion of the short-distance traffic. Now, however, the use of the road is being revived and it is just as dangerous to allow infirm and deaf people to stray upon the highways as it would be to allow them to walk about the vicinity of the railroad tracks.

Another form of risk on the highways, which is not sufficiently appreciated by many motorists, is that which is always present when ridden or led horses are concerned. Such animals nearly always display unaccountable tendencies to turn sideways toward passing vehicles, blocking up the greater part of the road, and it is safer for the driver of a motor car, observing a nervous or high-spirited animal, to stop altogether so that in case of accident no blame may rest upon the motorist.

It is foolish, of course, to imagine that the dangers of the road can be entirely eliminated or that any form of locomotion can become absolutely safe as regards other users of the highways, but mental alertness while driving a motor car upon the public roads has become more and more essential if the driver would be a true master of his craft; and the maxim that it is "the unexpected that often happens" should always be present in the minds of the drivers. Foresight and caution are, in the case of many well known and good drivers, natural gifts, but the stupidest motorist can acquire the habits of cultivating two features by setting his mind to do so.

A remedy for this almost universal breaking of the rules of the road, which is not only desirable, but practical reform, would seem to lie in the teaching of the rules of the road and the dangers of the traffic in every elementary school. A dozen or so simple rules, illustrated by diagrams, would in a very few lessons teach the best way of avoiding the undoubtedly increasing dangers of the highways. While the pedestrian has certain special rights, there is no reason to believe that the majority of those who walk are so intolerant and selfish as to wish to cause unnecessary dangers to vehicular traffic. It is true, therefore, that if schools of every description taught their pupils the ordinary rules of the road many accidents would be thereby averted and much of the chaos, risk and disorder in our traffic would be cured.

### Jefferson Highway Assured.

Co-related with the Louisiana good roads movement, the Jefferson Highway Association, extending from New Orleans to Winnipeg, Canada, is twenty-five percent completed, according to Walter Parker, general manager of the New Orleans Association of Commerce. Mr. Parker as treasurer of the Jefferson Highway Association has just returned from an automobile trip over the northern end of the route from St. Joseph, Missouri to Winnipeg. The Jefferson is acknowledged to be the best organized and most adequately financed highway association in the United States and the success of the movement to connect the Gulf of Mexico at New Orleans with the Dominion of Canada at Winnipeg has been one of the inspiring features of the good roads movement in this country. The route is north-west in Louisiana, passing through Donaldsonville, Baton Rouge, Alexandria and Shreveport.

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# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### Illinois.

Cook county has thirty-seven miles of permanent roads under construction. Superintendent of Highways Quinlan said recently that all this will be completed this year. It is all eighteen feet wide and of concrete or asphaltic concrete.

Nothing like this ever happened before in Cook county. The total amount of concrete and brick roads heretofore constructed is a trifle less than seventeen miles.

This awakening is not coming too soon. Within a week the number of autos in Cook county will probably reach 100,000. They need good roads, carefully constructed, permanent roads. Compare Cook county with the entire nation of France. It had 122,000 motor-driven vehicles when the war started in 1914, according to Edwin A. Stevens, New Jersey's commissioner of public roads. Cook county has a population of about 2,700,000; France's is in the neighborhood of 40,000,000.

The road mileage of France is approximately 357,000. Cook county's outside of Chicago is a trifle over 1,300. France has a total area of 207,000 square miles, while Cook county has 900, including the 200 square miles within Chicago.

It is evident that the motor vehicle traffic on the Cook county roads will average much heavier than upon the roads in France, which were excellent before the war started. This is appreciated by Quinlan, who operates one of the few public offices where they are forced to work Saturday afternoons.

He is collecting some information to show how good permanent roads increase the number of autos. The federal government recently gave out figures showing there is one auto for every 44 persons in the country and then predicted that by 1918 there will be one auto for each 25 persons. With the large sums which are and will be available for Cook county, Mr. Quinlan anticipates that the increase will be larger in Cook county than probably in any other one county in the United States.

\* \* \*

### Mississippi.

Significant in the late rapid development of Mississippi has been the state-wide good roads movement. Ten years ago there were only thirteen counties in the State that were putting out any efforts on road building, and some of these were of the crudest. Today, just one short decade past, practically every one of the seventy-eight counties of this State is actively engaged in building permanent roadbeds along the most prominent highways, and almost before one road can be completed, plans are being laid for opening up other outlets, whereby the farmers may more easily market their produce.

Something more than ten million dollars has been put into Mississippi's highways since the beginning of this movement, and among the notable benefits accruing as a civic investment must be mentioned a market impetus to the establishment of consolidated schools whereby the country child now has the advantage of a high school education as well as a more extended scope of association and environment; the promotion of all community activities; the encouragement of rural mail

deliveries, and the placing of the opportunities, and enjoyment of city life within easy reach of the farmer and his family.

While the ten million dollars already expended has given Mississippi the nucleus for a splendid highway system, it will be necessary to spend three times that much before this system shall be complete. To secure the money for this purpose within a reasonable time without an additional taxation it is essential that the State's population be increased and more of her idle lands put into use with a corresponding increase in tax values on what had been waste property.

\* \* \*

### North Carolina.

Speaking at the opening of the State Fair last month, Governor Craig said:

"In the last 16 years there have been built in North Carolina 1,500 miles of railroad, and 15,000 miles of improved highways. The facilities of transportation have been carried to the remote sections. Our cities and towns have been in a large measure relieved from the unjust discrimination in transportation that has heretofore prevailed against them. By this freight rate adjustment the saving to North Carolinians has amounted to millions of dollars. The effect is manifest in the increasing prosperity of our cities and towns. The unjust discrimination has to a large extent been corrected. Our wholesale merchants are now competing with the merchants of other states.

"In 1900 we had no highways. The roads were avenues of mud and hills. During the last four years we built 10,000 miles of improved highways—twice as much as in all the preceding history of the state. In addition to this, we have graded about all of the principal roads of the state. From the Atlantic ocean to the Great Smoky mountains, and across the state from South Carolina to Virginia, there are now the finest roads for citizens and for tourists.

"During the last four years, North Carolina has spent more than \$15,000,000 on roads. This is not an expense. It is an investment that pays a dividend of 100 per cent every year. The last legislature established a highway commission to provide for a more efficient and a more systematic expenditure of the people's money.

"Nothing has contributed more to the prosperity and the happiness and social development of our country than these improved roads. The movement has gained a momentum that will result in the establishment of the best highways to every community. No community can be without the good roads, unless it be satisfied to lag behind in all the improvements of modern life in this day of enlightenment and progress. The old country road of rocks and mud and steep hills is a thing of the past. The highway immeasurably finer than the 'King's Highway' of old, has been established, with the swift and powerful vehicles of modern transportation."

\* \* \*

### South Carolina.

County Supervisor Willimon reports that the work on the Greenville, S. C., county roads is being pushed as

rapidly as possible and excellent progress has been made recently. Grading has been commenced on the Augusta road. The contractors, as is usual, will begin work at a point some distance out and work towards the city. This is done to save time and labor in hauling material. This road will be of concrete for the first mile out from the city, then of rocmac for about one and a half miles.

The bridge over Laurel creek on the Laurens road was completed last month. This is a most substantial structure and is a marked improvement over the old bridge. The road at this point was straightened and the new bridge constructed several hundred feet upstream from where the old structure stands. The cost of the new bridge was \$2,500 and it contains about 520 cubic yards of concrete. The cost was about half the contract price.

In consequence of a special invitation from Mr. E. J. Watson, State Commissioner of Agriculture, a meeting for the purpose of discussing the improvement of the road from Columbia to Charleston was recently held. It is urgent that the roads be improved immediately, that the coastal portion may get part of the tourist traffic, during the winter. It is believed an improvement of the road to Columbia would mean a great deal to Charleston as well as to Columbia. It is understood that whatever can be done in the way of improving the roads will be done, and it is hoped that the work will commence at once. Should the tourist find that roads between Charleston and Columbia are in bad condition, they will go over other routes, and Charleston will lose various benefits from these circumstances which can be easily rectified.

#### \* \* \* Tennessee.

Within the last three years Monroe county has made great strides in the way of road improvement. About that time several roads in the county were graded, costing approximately about \$300,000. None of the money was used at that time for macadam. Recently the County Court authorized and sold bonds to the amount of \$325,000 for macadamizing a large portion of the roads already graded and for the purpose of building additional roads in the county. The result will be when the roads now under construction are completed that about eighty-five miles of macadam roads will be owned by Monroe county. These roads under construction are all the principal thoroughfares in the county. There will be nearly 150 miles of graded road in addition to the macadamized roads. As one result of this road building the farmers are building better houses, putting up better fences and are taking more interest in their farm work. It is said that farms are at least 50 per cent better than they were three years ago. Madisonville, the seat of Monroe county, is also taking on new life.

The Knox county good roads commission adopted the fifth quarterly report compiled by the clerk to the county court. This report shows expenditures amounting to \$109,072.20 for the quarter ending September 30, making total expenditures of the commission \$370,307.21.

#### Harris County Leads Texas.

Road construction in Harris county, Texas, took a new turn last year when the method of providing funds by anticipation warrants was adopted by the commissioners court. This plan was first adopted last spring.

Since that time a large number of roads have been improved by anticipation warrants.

The total amount set aside for the year was about half a million dollars, to be raised by a special tax levy which aggregates 8 cents. The total amount of anticipation warrant indebtedness contracted for and paid to date is about \$443,000.

While shell and gravel as material for road buildings still prevail in the county, new materials for surfacing roads, especially those leading out of the city of Houston, are being used. Asphalt and concrete have in a large measure taken the place of shell and gravel for this purpose.

Harris county now has about 1300 miles of improved highways, said to be the finest in the State. In the number of miles of roadway it exceeds any other county in the State. Of the above amount about 450 are shell roads and 150 gravel. The remainder are good dirt roads, except the big avenues leading from the city and which are under construction.

During the past year about 24 new miles of roadway were built, of which 15 were made of shell and the remainder of gravel. Besides these new roads, a number of old roads were repaired and resurfaced. Three new large bridges were built. They are the Telephone Cut off bridge, the Hillendahl bridge and the Cypress creek bridge. A number of others are under construction.

During the past year about \$350,000 has been expended for road construction and improvement. This does not include the roads being built out of the anticipation warrants funds.

The two biggest road projects of the past year were the rebuilding of the Harrisburg boulevard and bridge and the completion of the Main street boulevard near the city of Houston. Both of these projects will be ready for service before the end of the year. The former is being constructed from anticipation warrant funds and the latter from the \$1,000,000 special road and bridge fund.

The Main street boulevard when completed will be a beautiful stretch of road extending from the end of the pavement of Main street beyond the Rice Institute to Bellaire. A central esplanade or parkway will extend the entire way.

The Harrisburg boulevard will be a broad highway from the city limits through Central and Magnolia Park, providing an avenue of travel between Houston and Galveston. Thousands of automobilists make use of this roadway throughout the year in going to the summer resorts and their country homes and it will fill a long felt want.

The roads and bridges which are being built out of anticipation warrant funds and for which already authorization has been made which already have been built or contracted for with the amounts so far authorized to be paid are as follows:

Harrisburg boulevard, \$175,000; Harrisburg bridge, \$38,313.51; Chocolate bayou road, \$37,861.60; Clark street road, \$21,217.99; Evergreen road, \$3,038; Wooster and Cedar bayou road, \$10,050; Wilson and Ramsey road, \$9,144; Market street road, \$12,042.44; Lynchburg and Cedar bayou road, \$9,413.35; Moonshine Hill road, \$12,790; Knykendahl road, \$14,436.58; East Montgomery road, \$4,910; Houston-Humble road, \$61,041.10; Wallsville road, \$2,562; Market street ferry, \$375; Sheldon road ferry, \$375; Plum and Bay streets, \$1,900; Cypress and Rose Hill road, \$18,655.

An election has been ordered on \$500,000 road bonds in Tucker county, W. Va.

### Red Letter Day for Alabama.

October 6th was Red Letter Day in Alabama in the history of road meetings in the south. The United States Good Roads Association called and promoted a meeting for the purpose of building a national highway connecting Memphis, Birmingham and Atlanta. This meeting convened in Birmingham on October 6th and aroused much interest. There were delegates in attendance from Tennessee, Mississippi, Alabama and Georgia. Over 300 delegates were registered and took part in the convention.

There were three routes west from Birmingham to Memphis, and three routes proposed east to Atlanta. The various contesting delegates arrived early to present their claims and commenced to fight for this highway through their respective sections.

The convention was organized with John W. O'Neill as Temporary President, and J. A. Rountree, Secretary of the United States Good Roads Association, as Temporary Secretary. After much discussion of the various routes the most direct, which is known as the Air-Line route from Memphis to Atlanta, was adopted. An association to be known as the Bankhead Highway Association was perfected for the purpose of promoting and building a highway from Memphis via Birmingham to Atlanta, and named in honor of Senator John H. Bankhead, who is the author of the Bankhead good roads bill appropriating \$85,000,000 for roads throughout the nation, and also the President of the United States Good Roads Association. The naming of this route was a distinct honor for this American, who has done so much for the cause of good roads.

It was decided to incorporate the Bankhead Highway Association with Headquarters in Birmingham. The following officers were elected for the ensuing year. T. S. Plowman, Talladega, president; O. J. Knox, Pontotoc, Miss., first vice president; J. C. Sproull, Anniston, second vice president; W. A. Johnston, Memphis, Tenn., third vice president; J. Asa Rountree, Birmingham, Ala., secretary; A. S. Preston, Jasper, Ala., treasurer. Directors: Alabama, John W. O'Neill, Birmingham; W. C. Davis, Jasper; Mississippi, L. G. Fant, Holly Springs; W. A. Boone, Pontotoc; Tennessee, Henry Hayley, Memphis; C. M. Niminger, Memphis; Georgia, Oscar Mills, Atlanta; T. R. Whitley, Douglasville. Director at large Private John Allen of Tupelo, Miss.

It was decided that later on a scouting party would start at Birmingham and traverse the road to Memphis. Then later on to start at Birmingham and traverse the road to Atlanta. The meeting was one of the most successful and enthusiastic of its kind ever held in the south.

The Bankhead Highway opens up a territory and links with the National Highway at Atlanta and the All Southern Highway at Memphis. Senator John H. Bankhead was in attendance of the convention and took an active part in the proceedings. He was very grateful for the compliment paid him.

The Dupont Company is doing demonstration work in dynamite uses in road building upon the highway from Columbia to Charleston, S. C., work upon which is now well under way.

Columbia county, Fla., will complete its portion of the National Highway at once. \$5,000 has been set aside by the county commissioners and the Federal government will furnish a portion of the funds.

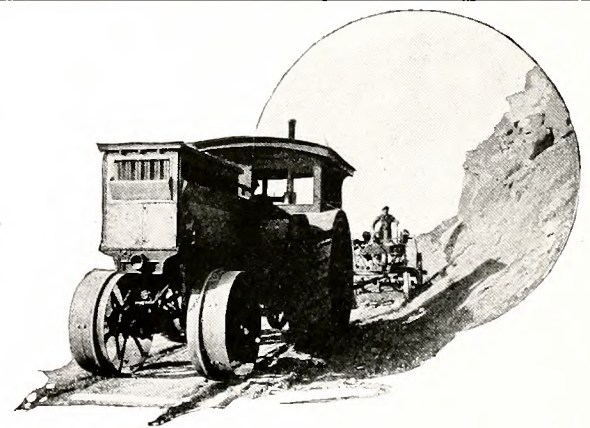
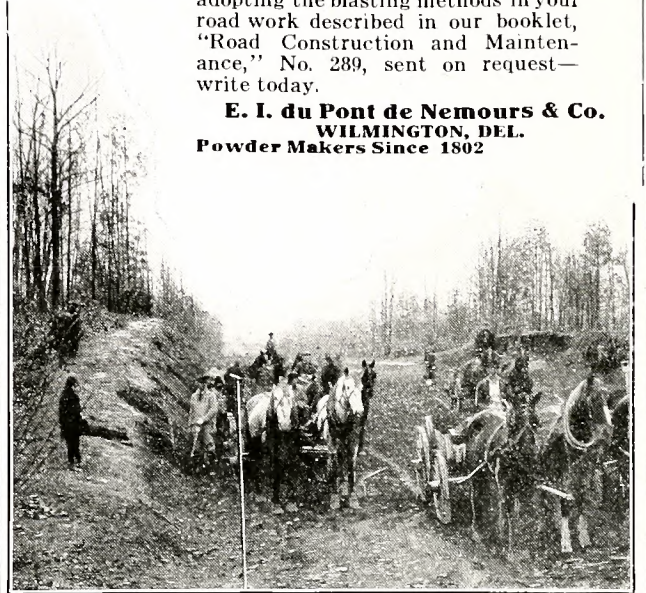
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### Florida Road Department.

At the annual meeting of the State Road Department of Florida, held in Tallahassee Wednesday, October 11, Hon. Ed. Scott, of Arcadia, representing the First Congressional District, was re-elected chairman and Hon. Jefferson D. Smith, of Marianna, representing the Third Congressional District, was re-elected secretary of the department. The full membership of the department was in attendance, the other members being Captain W. J. Hillman, of Live Oak, Second Congressional District; Hon. M. M. Smith, of Orlando, Fourth Congressional District, and Hon. F. O. Miller, of Jacksonville, state at large.

The department was organized just one year ago, but it could not get down to real work until the middle of the month of May, when a State road commissioner was appointed. This delay was caused by a number of the counties questioning the constitutionality of the act creating the department, necessitating a suit in the supreme court to compel the payment of the 15 per cent of the county tax on automobiles, the only appropriation made for the maintenance of the department. The suit was decided by the supreme court in favor of the state road department, the act being declared valid in every particular. Following this decision the department appointed William F. Coker, formerly division engineer of the Virginia Highway Commission, as State road commissioner. Since that time the work of the department has been pushed and has already resulted in much good to a number of counties of the state.

### Louisiana Builds Jefferson Route.

Central and Northwestern Louisiana parishes are energetically building the Louisiana link of the Jefferson highway, which is to stretch from New Orleans to Winnipeg, Canada, according to General Manager Walter Parker of the Association of Commerce. Sections of highway now built and to be designated as part of the Jefferson route, added to other links for which construction contracts are let, will give the state more than 200 miles of completed road early in the year.

A. D. Alderson, treasurer and manager of the Vicksburg, Alexandria and Southern railway, of Alexandria, said that Alexandria is a hotbed of road-building work.

"Rapides parish has voted \$400,000 in bonds for good roads in the past year," Mr. Alderson said. "Some sixty miles of road to be built with this money are to constitute the Rapides parish link of the Jefferson highway, and fifty miles are to be built in other parts of the parish. All of it is to be standard, hard-surfaced highway."

Natchitoches parish has voted a bond issue of \$250,000 for the Jefferson system and other highways in that parish. Avoyelles, Sabine and De Soto parishes are others that are moving energetically, Mr. Parker said.

The McTighe Hughey Co. has been given the contract for building eighty miles of roads around Holly Springs, Miss. They have just completed seventy-five miles of gravel roads at Crystal Springs.

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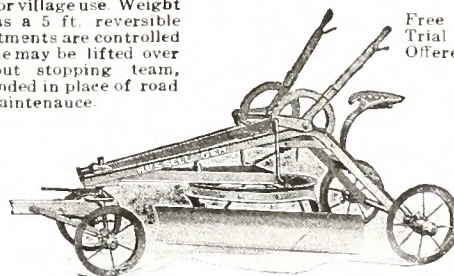
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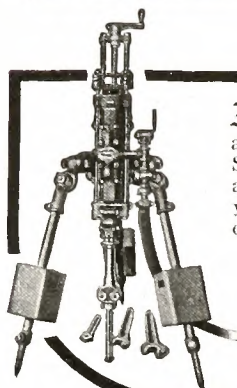
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### Big Road Project in Texas.

Organization of the El Paso-Fort Worth Good Roads association was perfected at a meeting in Midland, at which six hundred delegates from the nineteen counties which the road will traverse, were present. County Judge Jesse M. Brown, declared that the contemplated road is the biggest project of its kind ever contemplated in the state, and that the completion of the highway, which is now assured, will be a tremendous boost to Fort Worth.

The main line of the road will connect Fort Worth, Mineral Wells, Abilene, Sweetwater, Colorado, Big Springs, Midland, Pecos, Van Horn, Sierra Blanca and El Paso. The road will be 650 miles long and will form an important link in the national highways from coast to coast.

Federal aid is assured. The enormous appropriation for good roads voted by congress is being universally applied in every state to the project, which will benefit the greatest number of people, and there has been none even contemplated in Texas which can vie in magnitude with the El Paso-Fort Worth project.

D. E. Kolp, secretary of the Texas Good Roads association, told the delegates that he was satisfied he could secure the service of a federal government engineer to supervise the survey through the different counties and estimate the cost, in order that bond issues might be arranged for. Representatives of the nineteen counties agreed to pay \$25 per month to secure the employment of an additional engineer.

Present at the meeting were seventeen county judges and from one to three commissioners from every one of the nineteen counties.

There are numerous stretches of road along the proposed highway that will need no improvement. According to Judge Brown, Tarrant county will need to build but nine miles of road. A twenty-mile stretch in Palo Pinto county has been pronounced perfect.

"It was the most enthusiastic road meeting I ever attended," said Judge Brown. "The project is the biggest of its kind in the state. It will doubtless be carried through and will be a great factor in the upbuilding of Fort Worth."

County Judge S. A. Penix of Mitchell county was elected president of the association; W. B. Starr, of Midland, secretary, and J. C. Hunter, M. F. Burns, C. H. Ernest and Dr. J. H. Eastland, vice presidents. A board of nineteen directors, one from each of the counties which the road will penetrate, was chosen. W. G. Turner represents Tarrant county on the board.

### A CORRECTION.

In October Southern Good Roads Credit for a splendid article, entitled "The Cost of a Road," was given to Mr. Robert Irmes, when the author of this paper was Mr. E. W. James, of the U. S. Office of Public Roads. The error was due to the inadvertent shifting of title heads in making up the magazine. Editors who copied from this article will please make note.

### American Road Builders' Association.

The fourteenth annual convention of the American Road Builders' Association will be held in Mechanics Building, Boston, Massachusetts, during the week beginning February 5, 1917. The program, which is in course of preparation, will include papers and discussions on subjects connected with road and bridge building and street paving by the foremost authorities of the United States and Canada.

In connection with the convention, and in the same building, will be held the Eighth National Good Roads Show. This exposition will include exhibits by leading manufacturers in the United States of the machinery and materials used in road and paving construction and maintenance.

This exhibition, which has been a feature of the American Road Builders' Association conventions for a number of years, has increased in size and interest year after year. The coming exhibition takes on added importance on account of the enormous sum of money appropriated under the recently enacted Federal Aid Law and the additional large sums to be expended for road building by the various states and smaller units of government.

Mechanics Building, in which the convention and Good Roads Show will be held, is admirably situated and fully equipped for the purpose. It is located on Huntington Avenue, within convenient distance of the leading hotels and business district of Boston. The building is well lighted and heated, and is thoroughly modern in its appointments. It contains ample space for practically any number of exhibits, and is adaptable to exhibits of any size, as the floor plans just published indicate.

The management announces that the services of Mr. H. G. McConaughy have been secured as Director of Exhibits. Mr. McConaughy has had many years' experience in this line of work and is well known in connection with the management of the exhibitions held under the auspices of the American Electric Railway Manufacturers Association.

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# SOUTHERN GOOD ROADS

Published Monthly  
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## Progress in Federal Aid Road Building

Approved by the U. S. Office of Public Roads and Rural Engineering

THE FEDERAL aid road law went into effect on July 1, but before that date the U. S. Office of Public Roads and Rural Engineering had made plans for carrying out the provisions of the law which it is the duty of the Department of Agriculture, of which it is a branch, to administer. In order for federal aid to be granted to any state it is necessary for the legislature to accept the terms of the act, or for the governor to do so temporarily until the legislature has an opportunity to do so. The legislature of Georgia has passed such a resolution of assent and temporary assent has been given by the governors of most of the States. The legal branch of the Department of Agriculture is now passing upon the legal sufficiency of these assents, and has already considered those of eighteen states.

The Secretary of Agriculture has interpreted the law to mean that in accepting the terms of the act a state, as a matter of course, pledges its faith to a five-year program because the federal government will furnish aid during a five-year period. This he regards as important because it makes possible the arrangement of a comprehensive scheme of road building. He holds that the expenditure of the entire amount of money contemplated under the act should be planned at the outset so far as possible, and road systems conceived accordingly. This does not bind the state legislature to make an appropriation at the first session for the five-year period; indeed, this is prevented by the constitutions of some States. It merely involves a pledge of the state's faith to continue its appropriations to match those of the federal government according to the terms of the act. California is the only state as yet which has met every requirement of the law. Georgia and Maine have complied with all requirements except the submission of a general program of road improvements. In Connecticut, New Hampshire, Pennsylvania, Idaho and Louisiana, the pledge of the faith of the states to match the federal appropriations for five years have not yet been given, but is expected soon. In New York, Vermont and Wisconsin, further legislation is considered necessary by their officials before the federal co-operation can be utilized. In Virginia, where the state highway department has no authority to submit a state-wide project for road improvements, the pledge of the faith of the state to the terms of the act and the submission of a five-year roadbuilding program are particularly difficult matters to adjust and are receiving the earnest attention of the state and federal authorities.

The states with which formal negotiations looking to early participation in federal aid have not yet been

carried on are Arkansas, Delaware, Florida, Illinois, Indiana, Kentucky, Maryland, Mississippi, Nebraska, Nevada, New Mexico, North Carolina, Ohio, South Dakota, South Carolina, Tennessee, Texas, Utah, Washington, West Virginia and Wyoming. Informal correspondence shows that many of these states will be in a position to take up the subject formally before long. The Office of Public Roads has prepared a state highway bill for the consideration of the Texas legislature and is cooperating with the Oregon Association of County Judges in the preparation of an entirely new road law for that state. Drafts of road bills are being prepared for South Carolina, South Dakota and Nevada at the request of officials of those states.

### Administration of the Law.

The administration of the federal aid road law has made necessary a reorganization of the Office of Public Roads, for the organization suitable when its duties were mainly research and technical cooperation with road builders was not adapted for the additional work of supervising the expenditure of over \$150,000,000 of federal and state money in all parts of the country. The director of the office, Logan Waller Page, has accordingly assigned to P. St. J. Wilson, chief engineer of the office, the charge of all the engineering work, and to J. E. Pennybacker, chief of management, the charge of all other work. For convenience and expedition in handling the engineering work, the country has been divided into ten districts, as follows:

District 1.—Washington, Oregon and Idaho. Headquarters probably in Portland. District engineer, L. L. Hewes.

District 2.—California, Nevada, Arizona and New Mexico. Headquarters in Berkeley. District engineer, C. H. Sweetser.

District 3.—Montana, Wyoming, Utah and Colorado. Headquarters in Denver. District engineer, J. A. Whittaker.

District 4.—North Dakota, South Dakota, Minnesota and Wisconsin. Headquarters probably in St. Paul or Minneapolis. District engineer, E. O. Hathaway.

District 5.—Nebraska, Iowa, Kansas and Missouri. Headquarters probably in Omaha or Kansas City. District engineer, J. C. Wonders.

District 6.—Arkansas, Louisiana, Oklahoma and Texas. Headquarters probably at Dallas or Fort Worth. District engineer, J. D. Fauntleroy.

District 7.—Michigan, Illinois, Indiana and Kentucky. Headquarters at South Chicago. District engineer, J. T. Voshell.

District 8.—Florida, Georgia, Alabama, Mississippi,

South Carolina and Tennessee. Headquarters probably at Montgomery or Birmingham. District engineer, J. T. Bullen.

District 9.—Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont. Headquarters probably at Troy. District engineer, Guy H. Miller.

District 10.—Pennsylvania, Ohio, West Virginia, Virginia, Maryland and North Carolina. District headquarters at Washington. District engineer, H. K. Bishop.

The economic and statistical investigations and the cooperative work in legislative matters pertaining to federal aid work, and the management of the administrative details not connected with engineering matters will be directed from Washington by Mr. Pennybacker.

A system of general inspection under Director Page's personal control will be carried on by T. Warren Allen, formerly a State Highway Commissioner of New York, and E. W. James, formerly in charge of the road maintenance work of the Office.

Six definite projects have been submitted by the California Highway department for using the federal allotment to that state for the current fiscal year, and one of these was the first project to be formally approved under the federal aid road law. This indicates that distance from Washington has little effect in retarding the granting of federal aid when the terms of the act have been met by a state in every way. Georgia has submitted four projects, Pennsylvania three, Connecticut one, Colorado one and Idaho one, and information regarding projects to be presented has been received from several other states.

When it is considered that road management and road legislation in many states are in a confused condition, due to lack of interest, the influence of local politics or uncertainty regarding the best organization

for securing efficiency in such work, the progress in this cooperative work of the nation with the states has been very satisfactory. The experience since July 1 shows that there will soon be a great improvement in state road laws under the educating influence of this cooperation. Localities which were entirely satisfied with their methods until recently, are evincing a desire to improve them. People who have paid road taxes regularly without much objection to the mud and ruts they received in return for their taxes are looking forward with interest to what the federal aid road law will accomplish. It is a law for permanent improvements, because federal aid automatically stops unless roads previously built with it are maintained properly by the states or their subdivisions. This maintenance feature of the law is the most interesting part of it in many respects, for roadbuilding with concurrent road maintenance is as ridiculous as building a fireplace and failing to connect it with a chimney.

#### Texas County Votes Again.

A mass meeting of Denton County, Texas, farmers and business men that packed the District Court room to its full capacity on the main floor and in the balcony argued good roads for two hours and forty minutes and finally decided on a million-dollar county-wide issue. Petitions were drawn and presented to the Commissioners' Court and the election was ordered for Dec. 21. The issue is \$100,000 larger than the one defeated in the recent election. Twelve thousand dollars is to be spent in Denton connecting the main roads to the square and the other incorporated towns of the county will receive proportionate amounts for that purpose.

Scott county, Va., is now engaged in completing its portion of the Boone Highway.



Gravel Road Between San Antonio and Houston, Texas

# Texas Goes Swiftly Ahead

**Prepared for Southern Good Roads by D. E. COLP, Secretary of Texas Good Roads Association and Boxer County Highway League, San Antonio, Tex.**

**P**ROBABLY in no State in the Union is there so much consistent and persistent activity in the field of road building as there is in Texas and the Texas Good Roads Association, the Texas division of the National Highways Association, is unable to keep up with calls for assistance in laying out, logging and inspecting proposed routes for through highways and assisting in the detail work in connection with improving those on which work is going on.

That the roads of this State are in good condition was conclusively proved November 3 and 4 when a seven passenger tourist car was driven across the entire State from the Red river to the Rio Grande, a distance of 628.2 miles, in twenty hours and eight minutes, more than half of this being over roads with which the drivers were unfamiliar and in the night.

This was a part of a non-stop run which originally was intended to be from Winnipeg, Canada, to Laredo, on the Texas-Mexican border and Galveston, on the Gulf of Mexico, bearing messages from the Lieutenant Governor and Premier of Manitoba and mayor of Winnipeg to Governor Ferguson of Texas and the mayors of Laredo and Galveston, but at the last moment those who had agreed to carry the messages across North Dakota "laid down," alleging that the roads were "impassable," and the messages were mailed from Winnipeg to Yankton, South Dakota, where Harry L. Robinson, secretary of the Commercial Association, had thoroughly organized the State for the purpose of relaying the message without a stop.

Nineteen hours after the schedule arranged for the automobiles in the contest against the railway trains, these letters not having arrived, substitute messages from the Governor of Kansas and the mayor of Salina were prepared and the first automobile started from Chester, Nebraska at 6:30 o'clock, Friday morning, November 3, and at the same moment, duplicate messages, bearing special delivery stamps were dropped into the post office as were other duplicates bearing only the ordinary postage.

In the ensuing run the superiority of the automobile over the railway train, as well as the excellence of the roads of Kansas, Oklahoma and Texas, were incontrovertibly proved for the messages conveyed by auto reached San Antonio, Texas, twenty-two hours and forty minutes ahead of the one bearing the special delivery stamps, and they were more than thirty-three hours behind them.

The messages conveyed by auto reached San Antonio at 10:24 a. m., Saturday, November 4, the special delivery letters mailed, were delivered at 9:05 Sunday morning and the letters bearing merely postage stamps, reached San Antonio at 6:30 Monday evening but were not delivered until 9:30 Tuesday morning, nearly seventy-two hours after the auto passed through the city.

This performance not only is a high compliment to the power of co-operation and automobiles but to the good roads of the states crossed. The State of Kansas, 267 miles, was covered in five hours and forty-five minutes, the message reaching the Oklahoma line at 12:15 p. m. Oklahoma, 279.8 miles was crossed in seven hours and fifty-five minutes, the messages being delivered to Lloyd Weaver of Wichita Falls, driving a Hud-

son Super Six at 8:10 p. m. which gave to the Texas drivers the task of driving the greater portion of the distance at night.

Weaver took the message to Fort Worth, a distance of 140.1 miles by 12:28 a. m., making the trip in four hours and eighteen minutes and there it was taken on the run by Charles Davis of San Antonio, also driving a Hudson Super-Six who carried it the entire distance to Laredo, 488.7 miles, reaching that place at 4:18 p. m. to find the main plaza thronged with thousands to see the mayor receive the much heralded missive.

It is expected that this drive, more than half of which was made at night over roads strange to the driver will go far to prove the condition of roads in this state and cause many motorists to turn their radiator toward the land of sunshine where roads are good 365 days every year and some years another day.

Then too, the Meridian is not, by any means, the only good road in the State—there are thousands of miles. In fact, Texas leads all States in good roads mileage and the work is still going on.

Millions of dollars are spent annually improving the



Perrin, Texas, Good Roads Meeting

roads in this State and the interest is not waning, but on the contrary, seems to be increasing. From \$5,000,000 to \$8,000,000 raised from road bond issues is being spent every year in addition to the hundreds of thousands of dollars raised through County warrants and special taxes.

As a result of organization work and assistance in details by the Texas Good Roads Association, practically every city of any size in the State has a system of good roads radiating from it and it is the desire and intention of the Association to see, as rapidly as possible that all are connected into a network of perfect, permanent highways by which the entire State may be covered.

To further this end the Association is working toward the establishing by the next Legislature of a Highway Department with every promise of success. In fact, there practically is no opposition to the plan and it is generally believed that this will be one of the first measures enacted into a law when the law-making bodies meet.

Special attention has been paid by the Texas Good Roads Association, the Texas division of the National

Highway Association, in organizing local units on proposed through routes and the organizers have been meeting with flattering success.

During the last week of October we logged the Fort Worth-Roswell highway from Fort Worth, Texas to Roswell, New Mexico, a distance of 537 miles and it was found that considerable work already had been done on this line and interest manifested indicated that the near future would see it completed. In fact, the association already has been asked for—and furnished—an estimate for one of the counties on this route and plans for a sufficient bond issue to complete a system already are under way.

During the preceding month the Puget Sound to Gulf highway was inspected from San Antonio to Lubbock and a new proposed later from Lubbock to Austin inspected and logged. Also during the past month another route from San Antonio to Corpus Christi, a



One of San Antonio's Scenic Loops

distance of 160 miles, and the terminus of the Puget Sound-to-Gulf Route was gone over and it is probable that instead of one, there will be two highways between these places.

There were two reasons for the new route, one being that there apparently was too much lassitude on the part of the citizens of certain counties along the original line and the other being that the new route would have better natural roads to begin with. The further fact that there is intense interest on the new route leads to the belief that it will be but a short time until there is real action as bond issues for highway improvement already are being planned.

In fact, data on hand in the office of the Texas Good Roads Association seems sufficient to venture the assertion that Texas not only will stay at the head of all States in good roads mileage, but will continue right ahead of the procession until there are "Good Roads Everywhere."

### ROAD EDUCATION.

By J. B. Stoneking, M. E.

The increasing general interest being shown in road building throughout the United States, and the wholesale demand for better constructed and hard surfaced roads have called for more co-operation among the different communities and organizations interested in

this line of work. In fact, no other single subject has more of a vital personal interest to every inhabitant of our country. Stated briefly, the cost of living is considerably affected by the expense of hauling and delivering produce to the markets, and to the consumer. Do bad roads lower hauling costs? Who pays for this hauling ultimately? Ask yourself these pertinent questions.

According to the latest available statistics, there are in round numbers 2,450,000 miles of all sorts of roads in the United States. Here, the word "roads" is used indiscriminately, for some are just mere wagon trails, bog holes, and other places where the driver of a vehicle goes with fear and trepidation. Of this total, 275,000 miles have some sort of surfacing or wearing coat, and may be classed as improved roads. The vast amount of work to be done on the unimproved roads is appalling, but we can get an idea of the rapidity with which this is being done by noting the expenditures for road building and improvement. In 1904, there was approximately \$80,000,000 spent on roads; in 1914, \$250,000,000; and in 1915, \$282,000,000.

The latest impetus on a large scale has been the addition of federal aid, which has called for closer cooperation between municipal, county, state and government officials. It will lead to more logical planning of methods of construction, selection of routes, and a more comprehensive program of building and systems of maintenance.

The magnitude of the movement and work to be undertaken require a thorough knowledge of the different types of construction, so that the most modern methods may be selected and the greatest amount of good permanent work done at the least cost. There has been so much "hit-and-miss" road building, that a great deal of the work simply results in a total loss. By close cooperation among road officials, and the better education of the general public on road subjects, it is hoped that every dollar spent will bring its full value in actual comprehensive beneficial results.

The road campaign has been very materially aided by the free distribution for road bulletins published by the United States Department of Agriculture and by papers, circulars, and magazine articles from engineers, road officials, and the various highway and automobile associations. Another feature is the work of the large industrial companies who are more or less directly interested in road work. They send out photos, catalogues, bulletins, and specifications covering modern road machinery, methods of construction, types of standard roads, concrete, macadam, and the various tar and oil binders.

Among the latest means taken to further the educational side of road construction and maintenance is the road building moving picture film, made at considerable expense by the Du Pont Company, which has always manifested a great interest in any public movement having for its object the advancement of the general welfare and upbuilding of our country. This film, taken from actual construction scenes, shows the very latest up-to-date road building methods and has for its object the education of the general public, enabling them to talk and work intelligently on road subjects, thus lending their cooperation and aid in this most vital movement for the building up and progress of the whole nation.

South Carolina has marked the telephone poles along nine of the principal highway routes in the state.

# Report of Annual Meeting of the Alabama Good Roads Association

By J. A. ROUNTREE, Secretary

THE 20th session of the Alabama Good Roads Association convened in Birmingham on November 15th and 16th. The meeting was a most notable and successful one in every way. It was composed of an earnest, patriotic and unselfish set of life members and delegates that had gathered from all parts of the state to transact business that meant perpetuation of the Alabama Good Roads Association, which has been the pioneer in advocating and advancing the cause of good roads in Alabama for the past twenty years. The meeting was devoid of long winded speeches and talks on good roads, but real, practical talks were made on building, maintaining and raising funds to finance roads in the state.

An advanced step was taken by incorporating the body making it a permanent organization and establishing permanent Headquarters in Birmingham. The legal papers gave the association the right to hold institutes, good road schools, publish maps, bulletins, pamphlets, to co-operate with commercial and other civic bodies, and do all things necessary to advance the cause of good roads. It has the power to hold good road machinery exhibits and to have a permanent club room. The annual meetings are to be held the second Wednesday in October each year. The resolution incorporating the body was introduced by Mr. J. A. Rountree, who is one of the original founders, and who has served as Secretary of the Association for the past twenty years. The passage of this resolution and the adoption of the incorporation papers, which were prepared by Capt. Frank S. White, was received with a great deal of enthusiasm.

The association decided to create a Committee on Ways and Means to raise funds to start a propaganda of agitating and educating the people to change the constitution of Alabama to allow a fifty million dollar bond issue for good roads, to work the state convicts on the public roads, and to place all of the automobile tax upon the public roads. This committee will go actively to work on this propaganda.

One of the interesting features of the convention was a smoker at the Hillman Hotel, in which all the members, delegates and visitors participated in the same. A splendid set of stereopticon views of cement and permanent roads were shown by Mr. P. D. Burks, representing the Portland Cement Association, and Geo. H. Clark, Road Engineer for Jefferson county, exhibited and explained a number of scenes of good roads that were built and being built by the convicts of Jefferson county. This was a most interesting feature of the convention.

## Resolutions Adopted.

The various national highways that will traverse Alabama were discussed by the association, and a resolution endorsing and agreeing to co-operate with all of them was unanimously passed. The working of the convicts on the public roads of the state was the keynote of the convention.

Mr. John W. O'Neill, president of the Jefferson County Good Roads Association, presided at the opening sessions, and introduced Messrs. J. R. Hornady, City

Commissioner; Hugh McGeever, member of Board of Revenue; W. B. Everett, Secretary of the Chamber of Commerce, who delivered eloquent and cordial addresses of welcome to the members and delegates. Mr. J. E. Pierce, second vice president of the Alabama Good Roads Association, responded to the addresses of welcome in a graceful and entertaining address. Hon. John Craft, president of the Alabama Good Roads Association, was introduced and delivered his annual address outlining the great work that had been accomplished by the association during the past twenty years, and especially what had been accomplished during the past ten years of his administration as president. Mr. J. A. Rountree, Secretary of the Association, read his annual report giving a resume of the work of the association. It showed that the association had been quite active in assisting in promoting the Forrest Highway, Jackson Highway, Alabama-Georgia Highway, Natchez-Mobile Highway, John H. Bankhead Highway, Old Spanish Trail, Bankhead Highway Associations. He also told of the work that the organization had accomplished in organizing county associations during the past year. His report showed that there were 210 life members enrolled and that they were actively interested in the organization. He appealed to those present to incorporate the organization and put it upon a permanent basis.

He introduced a resolution which was adopted calling for the incorporation of the association under the laws of Alabama. This resolution was unanimously adopted. Ex-Senator Frank S. White, who had prepared all of the legal papers, read the same to the Association, which were unanimously adopted.

The following officers were elected for the ensuing year:

President—John Craft, Mobile, Ala.  
First Vice President—John W. O'Neill, Birmingham, Ala.  
Second Vice President—J. E. Pierce, Huntsville, Ala.  
Third Vice President—Frank S. White, Birmingham, Ala.  
Fourth Vice President—B. W. Duke, Gadsden, Ala.  
Secretary—J. A. Rountree, Birmingham, Ala.

## District Vice Presidents:

First District—W. L. Henderson, Mobile, Ala.  
Second—E. M. Lovelace, Brewton, Ala.  
Third—G. P. Butler, Opelika, Ala.  
Fourth—F. A. Gullett, Verbena, Ala.  
Fifth—C. E. Thomas, Prattville, Ala.  
Sixth—J. H. Pinson, Geiger, Ala.  
Seventh—W. P. Lay, Gadsden, Ala.  
Eighth—W. E. Skeggs, Decatur, Ala.  
Ninth—Job Going, Birmingham, Ala.  
Tenth—J. W. Shepherd, Jasper, Ala.

## Executive Committee State at Large.

John H. Bankhead, Jasper, Ala.  
Hugh McGeever, Birmingham, Ala.  
Governor Chas. Henderson, Montgomery, Ala.  
W. W. Brandon, Tuscaloosa, Ala.  
Dr. H. A. Elkourie, Birmingham, Ala.  
Albert P. Bush, Mobile, Ala.

G. A. Nelson, Decatur, Ala.  
 H. K. Milner, Birmingham, Ala.  
 J. B. Ellis, Selma, Ala.  
 Clarendon Davis, Huntsville, Ala.  
 W. L. Waters, Alexander City, Ala.  
 Thos. Jones, Greensboro, Ala.

#### Executive Committee by Districts:

First—W. L. Bruce, Catherine, Ala.; W. H. Holcombe, Mobile, Ala.

Second—P. J. Cooney, Foley, Ala.; F. J. Cramton, Montgomery.

Third—G. N. Mitcham, Auburn; D. C. Turnipseed, Union Springs.

Fourth—L. F. Hooper, Selma; J. W. Abercrombie, Anniston.

Fifth—J. W. Overton, Wedowee; J. A. Wilkerson, Antaugaville.

Sixth—W. D. Seed, Tuscaloosa; W. F. Fitts, Tuscaloosa.

Seventh—L. L. Herzberg, Gadsden; W. T. Brown, Ragland.

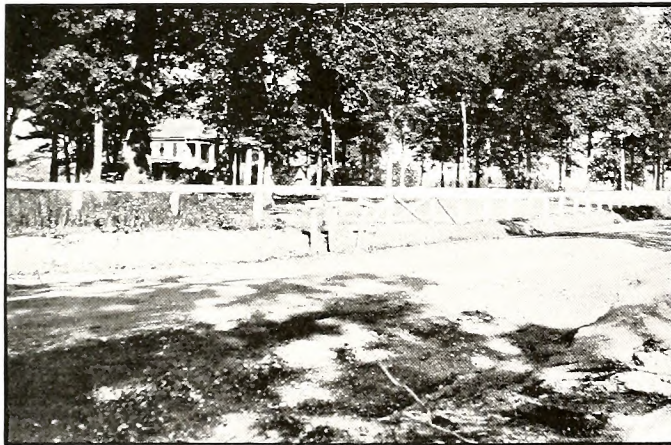
Eighth—E. B. Almon, Tuscumbia; R. E. Pettus, Huntsville.

Ninth—Dan Green, Birmingham; J. B. Elliott, Birmingham.

Tenth—W. C. Sparkman, Carrollton; E. P. Goodwin, Fayette.

The following resolutions were unanimously adopted:

Resolved, That this association endorse the bill now pending in Congress, introduced by Hon. Hugh Bent from the 2nd Alabama District, providing for an ap-



State Aid Road by Home of Col. Whiting, Near Talladega, Fla.

propriation of two hundred and fifty thousand dollars to construct a military road from Fort Morgan to the main land in Alabama, and urge our members of Congress to support said bill.

Whereas: The day is here when money spent to build roads is considered an investment and not a tax, and

Whereas road building has changed in method of construction and material used, and

Whereas there are near 3,000,000 automobiles in the United States, 26,000 of which are in Alabama, every owner being directly interested in better roads, and

Whereas improved legislation and awakened interest in better roads is needed in Alabama, therefore be it

Resolved, The President is authorized to appoint a Ways and Means Committee of three, to which the President and Secretary be added, to collect data, to awaken interest, to organize citizenship, to provide

Ways and Means and Method, with the end in view to prepare convincing information for presentation to and consideration of all candidates at the coming election, and be it further.

Resolved, The President is authorized and empowered to increase said committee when and by whom he deems necessary for the carrying out of work in hand, and be it further

Resolved, Such Committee is authorized and empowered to do any and all things necessary, to employ such assistance as needed for the purpose of securing better roads in Alabama, and be it further

Resolved, That when this meeting adjourns, such adjournment shall be until such data as the Association may be called together by the proper authorities, to which future meeting said committee will report the progress made on the work outlined and undertakes with the end in view of carrying on a vigorous campaign for modern good roads throughout the State and Nation.

#### Convicts on Roads.

Resolved, That this association is unalterably opposed to the present convict lease system of this State, by which the burden of raising revenue is transferred from the property of the State on to this already over-burdened convict suffering unfortunate class.

Resolved further, That the association favors abolishing said lease system, and placing the convicts of the State on the public roads, and further, that the members of this association are urged to do all in their power to bring about the accomplishment of these ends.

#### Endorsement of Highways.

Whereas, The Forrest Highway Association, Jackson Highway, The Bankhead Highway, the Old Spanish Trail, the John H. Bankhead Highway, the Alabama-Georgia Highway, Natchez-Mobile Highway Associations have been organized for the purpose of promoting specific highways through Alabama and adjoining States, therefore be it

Resolved, That the Alabama Good Roads Association most heartily endorses the work of these associations and pledges them its hearty co-operation and unqualified support and that these highways be built as soon as possible.

#### Good Roads Days.

Whereas, August 14th and 15th are legally designated and authorized Good Roads Days in Alabama, and it is made the duty of the Governor to issue a proclamation, the State Highway Commission to issue a bulletin, and other state officers to see that these days are observed, therefore be it

Resolved, That we call upon every good roads advocate and booster in the State to take active steps in co-operating with the State and County officials in making these days useful, beneficial and successful to the people of Alabama.

Resolved 1st, That the Alabama Good Roads Association urges that all delegates that are hereafter appointed to attend the annual meetings of this convention become regular members in accordance with the constitution and by-laws of this association, and that the secretary be authorized to collect the membership fee and issue certificates granting them the privileges and courtesies of the organization.

Resolved 2nd, That the Secretary and Treasurer be empowered to collect membership fees, solicit funds and do all things necessary to carry on the work of the association, and is hereby empowered to issue vouchers

and checks in payment of salaries, postage, printing, rents and all necessary bills, and to report same to the Board of Directors at regular and special meetings.

A special resolution of thanks to President Woodrow Wilson and Senator John H. Bankhead for their work and activity in making possible and securing the passage of the Bankhead \$75,000,000 appropriation for good roads was adopted. A special committee consisting of G. A. Nelson, T. L. Cannon, J. B. Elliott, John Craft and J. A. Rountree, was appointed to prepare this resolution, have same inscribed on parchment and sent to the President and also Senator Bankhead.

A committee on Ways and Means was created for the purposes of organizing an active campaign to secure funds to start a propaganda in the state to push good roads legislation. This committee consists of T. L. Cannon, Birmingham; W. T. Brown, Ragland; J. B. Lawrence, Dyas; F. A. Gullett, Verbena; W. F. Fitts, Tuscaloosa; G. A. Nelson, Decatur; W. L. Henderson, Mobile; W. P. Lay, Gadsden; W. M. Drennen, Birmingham; John Craft, Mobile; J. A. Rountree, Birmingham, Ala.

A special resolution of thanks was returned to the Jefferson County Good Roads Association, the Chamber of Commerce, newspapers and citizens of Birmingham for the courtesies extended to the convention.

Birmingham was made the legal headquarters of the Association, and all annual meetings for the transacting of business are to be held in this city.

### Regulation of Grade Crossings.

When shall an operator of a motor vehicle be compelled to come to a full stop at a railroad crossing at grade, was the question which occupied the most consideration in the recent conference at Washington, participated in by representatives of the National Association of Railway Commissioners, the American Automobile Association, and the American Railway Association.

The meeting had as its purpose the country-wide adoption of a uniform system of signals and other precautionary measures, it being set forth that "one sign should signify the same thing everywhere, installed so as to be in plain view of the driver of a vehicle and so that it could be plainly read at night by automobile headlights."

Unanimity existed as to the type of first warning sign to be erected by city, town, or county, and also that it should be located not less than 300 feet from a crossing. But the full stop proposition came in for much discussion. Chairman Osborne L. Yellott of the A. A. A. Legislative Board thus presents the contention of the motorists:

"It was realized by the A. A. A. representatives, who included President H. M. Rowe, that while the number of accidents at grade crossings was almost infinitesimally small in comparison with the number of such crossings made safely by motorists during the course of a year, nevertheless some steps should be taken to minimize accidents to the smallest possible degree. Two propositions were suggested by the spokesmen of the railroads; the first providing that within one hundred feet of the crossing the motor vehicles should not proceed at a rate of speed greater than ten miles per hour; and the second that the motor vehicle should be brought to a full stop not less than ten feet from the nearest rail of the crossing.

"The first suggestion was objected to on the ground that it was unreasonable and would tend to give rise to the maintenance of obnoxious speed traps at such

crossings, with resulting inconvenience and injustice to many motorists who were, in fact, exercising all proper caution in approaching the crossings in question. The second was objected to mainly on the ground that it was unreasonable to require motorists to stop at all crossings regardless, since in many instances the tracks in each direction are visible for such distances as to make stopping entirely unnecessary. It was finally agreed that motorists should be required to reduce speed and proceed cautiously at all crossings, and that the Public Service Commissions or Railroad Commissions of the several states should have the power to determine the crossings at which it was reasonably necessary that stops be made; such full stop crossings to be designated by appropriate signs, and the failure of a motorist to stop at such to be prima facie evidence that he had not proceeded cautiously in making such crossing.

"In making this latter concession the representatives of the motorists realize that there are some grade crossings at which ordinary prudence requires a full stop, and that inasmuch as conditions vary so much at this class of crossing, it would be better to leave the determination of such to responsible bodies such as Public Service Commissions."

### Decide Interstate Auto Rules.

Whether a state can tax a motorist road traveler from another state for the use of its roads will be decided in the near future by the United States Supreme Court, the argument for the so-called New Jersey test case prepared jointly by the American Automobile Association and the National Automobile Chamber of Commerce having been presented on the last day of October to the highest court in the land. John W. Griggs, former attorney general of the United States, was the spokesman for the owners organization and Charles Thaddens Terry appeared for the car makers. The case of Frank J. Kane vs. the State of New Jersey was based on the interstate journey of the plaintiff from New York to Pennsylvania, he being convicted and fined for a violation of three provisions of the New Jersey law—first that he had failed to register his automobile in New Jersey; second that he failed to pay the tax imposed on non-residents; and third, that he failed to file with the secretary of state a power of attorney.

### First Aid to California.

California is the first state to receive federal aid, under the recently enacted government good roads act, in the construction of its state highways. The application of the State Highway Commission was forwarded the day that the President signed the bill and the money is available now.

Five of the city projects submitted have been approved by the federal office in Washington. These total slightly more than twenty-five miles and involve an estimated expenditure of \$314,000. Of this sum, the government in the first year will appropriate \$140,000 for the rural post routes and \$155,000 for forest roads. For the rural route the state is expected to pay an equal amount equal to the government. The counties in which the forest roads are constructed are expected to pay part of the construction cost.

The Texas division of the Jefferson Highway sets 1919 as the year in which that state will complete its portion of the road.

# Going in Debt For Good Roads

By M. C. ELDRIDGE

Assistant in Road Economics, Office of Roads and Rural Engineering

**T**HE SUBJECT of ways and means of obtaining better roads is one in which every one should be interested. The time has passed when it is necessary to discuss the benefits of good roads, because every one realizes that good roads are beneficial; the important thing at the present time is to know how to obtain good roads. We are now spending in this country about 250 million dollars annually in building good roads. At the present time, there are outstanding in the United States about 275 million dollars of road and bridge bonds. If every dollar of this money were wisely and economically expended, we would have good roads everywhere in a very short time, but unfortunately that is not the case. We need more economical and efficient methods of raising and handling road funds in order that every dollar expended will accomplish a dollar's worth of work.

There are two ways by which funds are raised for good roads. One is by direct taxation, and the other is by borrowing the money or by going in debt. If a community is able to do so, it should by all means pay as it goes. It should levy a sufficient tax to build and maintain roads and avoid paying interest on borrowed money.

The chief advantage in the cash tax system lies in the fact that no interest charges have to be paid by the present or future generations. There are, unfortunately, many undeveloped communities in the United States in which it becomes advisable to borrow the money for road building in the same way that farmers borrow money to buy farms. If some farmers had to wait until they had the money to purchase their farms, they would probably never become land owners. The same is also true of many counties in which systems of good roads are urgently needed to develop the resources and reduce the hauling costs. They would have to wait indefinitely for good roads if they had to depend upon a cash tax for the necessary funds. Unless a community is able to raise by a cash system of taxation enough money to finance the building of its main market roads within a reasonable length of time, the benefits resulting from the improvement are apt to be piecemeal. On the other hand if a sufficient amount of money is raised either by direct tax or by a bond issue, the resultant benefits are immediate and certain, provided of course, that the money is wisely and judiciously expended under competent supervision.

## Wholesale Plan Cheaper.

Competent supervision is the crux of the whole matter. The pay-as-you-go plan too frequently involves a too small annual appropriation with a relatively large outlay for supervision and maintenance, or what is still worse practically no supervision or maintenance. With a larger fund the county can better afford to employ competent supervision and do the work on a large scale or by contract. It is usually cheaper to do road work on the wholesale than on the retail plan. It is relatively cheaper to build twenty or thirty miles of road a year than two or three miles a year.

It is urged by those who are opposed to "Going in Debt for Good Roads" that the interest on the money invested amounts, in some cases, to two or three times

the original cost of the improvement. If the right kind of bonds are issued and the money is wisely spent, the interest charges will not be two or three times greater and the benefits will usually far outweigh the interest on the funds invested. "Going in Debt for Good Roads" should be looked upon as an investment and not as an expense, and before a county invests its money it should be certain that the investment will pay.

## Some Saving in Costs.

A man from New Mexico told me yesterday that his county, a few years ago, invested in a bond issue to build a system of good roads and that a recent traffic study had shown that the saving in hauling costs amounted to about \$20,000 a year, which would be sufficient to pay for the whole bond issue, interest and principal, in about seven and one-half years. This was a good investment. Another gentleman told me a day



Horseshoe Curve in Vance County, North Carolina  
W. S. Fallis, Engineer  
J. F. Mulligan, Supt. Construction

or so ago that a county in Texas invested only four or five years ago in road bonds with which to build about twenty miles of roads, and that practically nothing has been spent on those roads for maintenance and that the roads have been almost entirely destroyed by the traffic and the elements. This was probably a good investment in the first place, but it was not safeguarded by proper maintenance. A county may properly borrow money to build roads, but should be required by law to set aside a sufficient annual tax to maintain its roads in good order so that the investment will be safeguarded.

Before a county invests in road building, it should determine first, the traffic area for the roads to be improved; second, the present and future traffic expressed in ton miles per annum; third, the estimated cost of hauling per ton mile at present and what it will be reduced to by the improvement; fourth, the roads to be improved and the probable cost of the improvement as borne out by those facts and by surveys and estimates made by a competent engineer; fifth, the present value of the lands abutting the roads and the increase in value which will probably result from the improvement; sixth, the present school attendance and the pos-

sibilities for school consolidation and increased attendance which will result from better roads; and seventh, the amount of tax that will be necessary to finance the undertaking whether the work is carried on by direct taxation or by funds derived from a bond issue.

#### The Paying Investment.

A study of these facts will enable a county to determine whether it can afford to invest in good roads, how much it can afford to invest, how many miles of road it can afford to build, and what kind of roads it will be most profitable to build. Such a study will usually show that about twenty per cent of the roads carry about ninety per cent of the traffic, and that the first requirement of the average community is the improvement of about one mile of roads out of every five miles in the county. It will also be found that it is not necessary to expend the same amount of money on all of the roads. For instance, one road may carry from four to five times the volume of traffic one or two miles out of the county seat or main market town, as it may be required to carry ten or twelve miles from town, and consequently the county can afford to spend four or five times as much for the construction and maintenance of the first and second mile as for the tenth or twelfth mile. The greatest good to the greatest number can be accomplished by carrying this principle into practice.

If the county decides to go into debt for good roads, it should decide in advance what kind of bonds are to be issued, whether long term bonds or short term bonds, whether sinking fund bonds or serial bonds. The people of a county would do well to consider the advantage of short term bonds for temporary improvements and long term bonds for work which is more or less permanent, and serial bonds over the ordinary sinking fund bonds.

I know of a county, which issued thirty-year sinking

fund bonds without providing a sinking fund. In 1910 these bonds became due and were retired by another issue of refunding bonds and again without providing a sinking fund. You will all agree that this is poor financing. It frequently happens that bonds are issued covering a term of fifty years and that by the time the bonds are paid, the interest charges mount to twice or three times the cost of the work performed. The aggregate of the approved state bond issue in one of our great and wealthy states for 1914 amounted to \$5,600,000 bearing interest at at four and four and one-half per cent and covering a fifty-year term before all would be redeemed. The State Comptroller of that State calculated that the interest at the end of that time will have amounted to \$8,800,000, or in round numbers \$3,000,000 more than the total issue. In other words, the cost to the State will be almost \$14,000,000 for the privilege of doing \$5,600,000 worth of work. It is a question whether the convenience is worth the price for a portion of the indebtedness is apt to long outlive the life of improvement.

The character of bonds to be issued for road building is a matter that has been sadly neglected. Many millions of dollars could be saved annually if the serial bond plan were adopted instead of the sinking fund plea. To illustrate this point let me explain the difference of the two plans, and the saving which would result from adopting the serial method. Under the serial plan a certain amount of bonds is retired each year and the bonds so retired cease to be an interest charge on the county. Under the sinking fund plan none of the bonds are retired until the end of a definite period, and the entire sum raised bears interest during the entire life of the bond. The county, therefore, pays interest on the money so borrowed and in addition sets aside each year as a sinking fund, an amount sufficient to retire all of the bonds when they



A Street Built in Carthage, Mo., by the "365-Day Road Club"

become due. The sinking fund is deposited with banks and bears some interest. This interest ordinarily is only three per cent, whereas the county has to pay from four to six per cent to the bondholders. The serial plan is a much cheaper method of raising money for road improvement even where the sinking fund bears interest as high as four per cent.

The total cost of a \$100,000 serial bond extending over a period of 20 years with interest bearing five per cent will amount to \$152,500, while the total cost of a sinking fund loan covering the same time and bearing the same rate of interest with a sinking fund bearing three per cent interest and compounded annually will amount to \$174,431 for each \$100,000 of bonds issued. Certainly this saving is worth considering.

It is not always advisable, however, to begin paying off a bond issue the first year of the loan. Counties should so arrange their financial obligations as to make the burden comparatively light at the very outset, thus giving the people a chance to develop their resources through the improvement of the roads. To do this, the burden should be distributed so equitably over a period of years that it will avoid the two extremes of excessive tax levies on the one hand to pay off the debt too quickly and the extension on the other hand of the debt beyond the life of the utility, in order to obtain a low tax rate.

#### **The Desirable Bond Type.**

The most desirable type of bond, therefore, appears to be one in which the first payment is made the fifth or sixth year from the date of issue and the other payments distributed equally over a certain term of years, depending on the probable life of the improvement.

Let us assume that \$100,000 of thirty-year five per cent serial bonds are to be issued. If the first payment is deferred to the end of the sixth year and the other payments made in equal annual amounts during the remaining twenty-four years, the total outlay for interest and principal will amount to approximately \$190,000. The total cost of a \$100,000 sinking fund loan covering the same term and bearing the same rate of interest with sinking funds bearing three per cent interest compounded annually, will amount to \$203,500, thus showing a saving for the deferred serial bond of \$13,500 for every \$100,000 of bonds issued. By adopting the deferred serial bond instead of the sinking-fund plan the average county could save more than enough to pay all engineering and overhead expenses.

In this connection I wish to quote from an article published in *The Annalist* in October, 1915. This article was prepared by Mr. Alfred D. Chandler of New York. Mr. Chandler says:

"When it was revealed to the Finance Committee of the New York Constitutional Convention that for every \$100,000,000 of New York's standard fifty-year sinking-fund bonds at 4 per cent the difference in interest between the sinking fund and the serial-bond method was the astounding sum of \$98,000,000, while the difference in actual cost if the sinking fund earned the accepted 3½ per cent, was \$35,690,000, or even if it could earn 6 per cent was \$14,934,400, it brought that convention to an impressive realization of New York's past neglect on this score and of the needless expenses attached to its present outstanding bonded debt, state and municipal, of about \$2,000,000,000, or about double the bonded debt of the United States."

The objection raised sometimes to serial bonds is

that they do not bring as good a price on the bond market as the sinking-fund bond. Let me reveal to you what Mr. Chandler says on that subject:

"Some hesitation arose as to the receptivity of the New York market for serial bonds, all doubts of which happily were removed pending the sessions of the convention by the successful marketing, (June 29, 1915,) of New York City's first serial-bond loan for \$24,000,000, at a higher price than was obtained or a simultaneous sinking-fund loan of \$46,000,000."

In conclusion I wish to call your attention to another important point that should be considered when bonds are issued for road improvement. The life or term of bonds should be approximately the same as the duration of the improvement. It is a mistake to issue fifty-year bonds for roads which will not last ten years. In other words, the indebtedness should be liquidated at a rate at least equivalent to the depreciation of the improvement thus financed. Some of the states have laws fixing the terms and character of the bonds that may be issued. So far as I know, New Jersey is the first and only state to limit the term of bonds to the probable usefulness of the improvement. The term of bonds in New Jersey is fixed by statute as follows: Stone, concrete, and iron bridges, thirty years; roads and streets built of concrete six inches thick, or of blocks of any material, or of sheet asphalt laid on concrete foundation, 20 years; bituminous concrete construction, fifteen years; water-bound macadam or penetration process, ten years, and gravel, five years. The New Jersey law provides that all municipal bonds shall be paid in annual installments commencing not more than two years from their date of issue, in other words, deferred serial bonds. Other states would do well to follow New Jersey's lead in this matter. If they did, it would have the effect of standardizing the issuance of road bonds and would result in the saving to the tax payer of many millions of dollars annually.

#### **California Bonds Won.**

Fifteen million dollars for the completion of the state highway system is available in California as a result of the election. Over-whelming endorsement of the big bond issue was given, insuring the paving of approximately 1,000 miles of roads in addition to the 1,122 miles already finished at an expense of \$16,000,000.

Initial work will be done on the trunk lines extending from San Diego to the northern boundary of the state. One fifth of the sum voted will be devoted to the construction of new highways amongst which will be one north from Los Angeles into the famed Sequoia forests. These giant trees are said to be the oldest living things in the world and will be the terminus of a highway expected to surpass all others in California in scenic beauty.

In addition to the state funds California has available immediately more than \$250,000 from the federal state road fund, this state having been first to obtain federal aid under the new government rural road act. Work also will begin at once sign posting the Mojave desert, over which crosses the only open-all-the-year-round highway from the east to California. The government appropriated funds for posting the water holes only after a battle extending over 14 years had been waged by the Los Angeles Chamber of Commerce, to make traveling over this highway absolutely safe for strangers.

# The Townsman's Interest in Rural Roads

SOME PERSONS living in cities say they have no interest in road building, that they have their hands full trying to keep the city streets in fair condition. "Let the hicks build their own roads, if they want them," is so often heard that the other view of the case has earned the privilege of a little space.

When the average townsman dresses in the morning, a large part of the clothes he put on are made of cotton, which has to be teamed over a good many miles from the plantations to the shipping points. If he has fruit, cereal, eggs and toast for breakfast, let us say, about everything he eats has been hauled over several miles of roads, either to be shipped to him or to the mills where it is prepared for shipment. A large part of the furniture in his home and at his office has been made from hardwood hauled over the roads. These and other things which anybody can list for himself must all vary in price to the townsman with the cost of hauling them from the farms and forests to the mills or railroad stations. Just what this fact means has been stated by J. E. Pennybacker, the highway economist of the United States Office of Public Roads, as follows:

"The public roads throughout the country, which constitute the primary means of transportation for all agricultural products, for many millions of tons of forest, mine and manufactured products, and which for a large percentage of farmers are the only avenues of transportation leading from the point of production to the point of consumption or rail shipment, have been improved to only a slight extent. By reason of this fact, the prevailing cost of hauling over these roads is about 23 cents per ton per mile. More than 350,000,000 tons are hauled over these roads each year, and the average haul is about 8 miles, from which it can readily be seen that our annual bill for hauling over the public roads is nearly \$650,000,000. The cost per ton-mile for hauling on hard-surfaced roads should not exceed 13 cents. It is therefore evident that if our roads were adequately improved a large annual saving in the cost of hauling would result."

The difference between 23 cents and 13 cents is 10 cents, which is the ton-mile tax of poor roads which the city people pay, for most of the hauling is toward markets or shipping points and the cost of this hauling is part of the total expense of products of the land to the consumer. The total is about \$280,000,000, which the 45,000,000 people living in the cities and towns of the United States pay annually on account of poor roads. This averages over six dollars a year per person.

Poor roads put a much more serious drain on the townsman's pocket-book, however. His food is costing him more every year, and he therefore has a very close, personal interest in having the agricultural lands farmed in such a way that they yield their largest returns at the lowest working cost. This means more than producing milk and vegetables at a low cost; it also includes raising at low expense the wheat and corn from which his flour and meal are made, producing fowls and hogs economically, and reducing the cost of growing cotton. How many intelligent young men, able to earn a good living in a city, will live in the country if they have to travel through miles of mud or dust, at decided physical discomfort, in order to market their products, meet their friends or buy their

supplies? How many young women will be willing to live in the country, where bad roads isolate them with only the sparrows for companions, with the doctor almost inaccessible, the schools hard for the children to reach, and church-going a real labor? Yet if the townsman is to have the things he eats grown for him efficiently and economically he must take his part in making country life agreeable and profitable to these intelligent young people. It means a saving of dollars and cents to him.

Good roads will go a long way toward solving this problem of getting many more of our fine, healthy young people into the country to raise our food products as they must be raised and at the same time raise up another generation of farmers and farmers wives, who will love the soil and the tilling thereof. There are two wonderfully convincing demonstrations of this that anybody can see and enjoy in the seeing. It is only necessary to ride along the turnpike from Philadelphia to Gettysburg, one of the oldest improved roads in the United States, to travel for a day through a rich farming country so well cultivated that farms, thrifty farms, are always in sight except within city limits. And when this region has been traversed, another famous old turnpike leading from Martinsburg, W. Va., to Staunton, Va., should be visited. For four years war ravaged this section; one town in it changed hands eighty times, four times in one day. The traces of that struggle can be seen in many places, but they are now merely historical landmarks. For here, as in Pennsylvania, the highway that has been a good road for so many years has turned this long valley into a marvelous panorama of well-cultivated fields and happy homes. If anybody who visits these two historical highways fails to become convinced that good roads are a very real help in agricultural developments there is something wrong with his eyesight or his brains. These facts are self-evident.

## On The Atlantic Highway.

More than usual attention is being given the announcement of the many improvements completed on the route of the Atlantic Highway and the extended opportunity for through North and South travel over that road as it marks a big step in the development of the Border Highway considered an economic and strategic need of the country at the present time.

The Border Highway originated by Henry B. Joy, president of the Lincoln Highway Association, has been planned to be developed along with the Lincoln, the Dixie, the Jefferson and other great through, connecting main routes of travel, as a national thoroughfare to be constructed in the same manner as that adopted in building the Panama Canal. It would run entirely around the border of the country at a relatively short distance from the sea coasts and Mexican and Canadian borders and be of the greatest commercial and military value.

The improvements along the Atlantic Highway above mentioned would care for more than 2000 miles of the route from Portland, Me., to Miami, Fla., and furnish a certain impetus to further activities along the same line.

Dade county, Fla., has formed a new road district and will call an election for \$85,000 bonds.



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**SUGGESTED ROAD LEGISLATION.**

The tax on automobiles is levied in excess of the actual cost of licensing the machine because the automobile is supposed to damage very materially the roads over which it is driven. It is, therefore only right and just that the automobile tax thus collected should be used for the maintenance of the roads that it is supposed to damage. At the present time a portion of the tax is supposed to be used in some way or other on the roads of the counties in which the automobilists reside, and the balance goes into the General Treasury of the State. All of the money raised by this automobile tax should be used for the maintenance of the main highways of the State, and should be done through the State Highway Commission. By doing this, the people of the State will be sure that this money will be used most economically and to the best advantage for the maintenance of the main highways of North Carolina. It will also enable the State Highway Commission to assure the Secretary of Agriculture of the United States that the roads built in North Carolina by Federal Aid will be maintained. The state is obliged to make this assurance if it is to participate in the Federal Aid road fund.

From the Federal Aid road fund North Carolina will in the next five years receive approximately \$570,000.

In order to obtain this money she has to raise at least as much as appropriated by the Federal Government. The State will have supervision of the location and construction of the roads built with this joint fund, this work to be done through the State Highway Commission. The Commission then must be equipped with men and supplies to enable it to carry on this work.

In addition to the supervision of this work, the State Highway Commission must be ready and able to assist all the counties in their road work. To enable it to do these two things which are demanded of it, it must have an adequate appropriation, and this Commission should receive at least \$50,000 per year from the State to enable it to carry on the work that is required of it.

The expense of the maintenance of the main highways of the State will, if the automobile tax is turned over to the State Highway Commission, be borne by the state, and this will relieve the counties of this expense, and give them more money for the maintenance of other roads in the county. There should, however, be some definite action taken by the General Assembly in regard to the maintenance of our highways, and a general law should be passed that any county issuing bonds for the construction of roads must provide each year by special tax an amount equal to a certain per cent of the value of the bond issue, and that the money thus raised shall be used for the maintenance of the highways constructed with the bond issue.

Some legislation should be passed by the General Assembly in regard to the kind of lights that automobiles shall be permitted to use. There is no doubt but that the blinding lights now used by so many automobiles are very dangerous to travel at night on the public roads. Without in any way diminishing the ease and facility of night travel of the automobile, the lights can be so regulated that they will not blind the driver of the approaching automobile, and yet give sufficient light for the drivers to see where they are going, even at a good rate of speed.

This question has become so serious that it is being agitated all over the country, and manufacturers of automobiles are giving it serious consideration, and many legislatures are considering legislative action regarding it.

While this is written to fit a specific case in several instances it might be more widely applied, for other states face the same situation as North Carolina.

**The Automobile in India.**

The opportunities for American business in India are greater today than ever before, according to C. C. Devore, Goodyear Tire & Rubber company resident representative at Bombay, India, who recently returned from the land of maharajahs, gaekwars and other potentates bearing unpronounceable names, to spend a few days at the factory at Akron, Ohio.

"There is a big field for automobiles in India," says Devore, "and they are being bought as fast as they

can be shipped into the country. We have about 15,000 cars in India now, with American makes leading in numbers. Motoring is popular, as the roads are good. The chief highways are stone surfaced and are kept in good condition for motoring. We have been fortunate in escaping any entailment of the importation of cars and have not been limited in our gasoline supply, although the price of gasoline, or petrol as it is called there, is very high.

"Many of the native rajahs and other prominent Indians have enormous garages with a magnificent collection of cars, including the costliest limousines. Usually European managers are found in charge of these garages with servants designated as special chauffeurs.

"Tire mileages are excellent, although tires are not treated as respectfully as in America. A great many of the car owners leave the operation of their cars to their servants, and tires naturally suffer from the effects of under-inflation and general lack of care. But notwithstanding this, mileages of 7,000 and 8,000 are not uncommon.

"India offers a big field for American trucks. There are now only about 500 trucks in the country, which is not a very large number when you consider the size of that great empire.

"Bicycling is very popular. About 100,000 bicycles are being ridden—chiefly for pleasure. Most of these are European machines, the tires of which are of the wired-on clincher type. The single tube bicycle tire is not used.

"Motorcycles are very numerous, American-made machines predominating. They are used almost exclusively for pleasure. Side cars are used extensively—in fact, you see more side car outfits than solo machines.

"But although the number of other vehicles is constantly increasing, there are still multitudes of gharries, or carriages, usually rubber tired, and the vocation of gharri-walls, or carriage-driver, is a popular one. Four o'clock in the afternoon sees about everybody in the cities going out for a drive to obtain relief from the heat of the day."

### Glaring Headlight Problem.

"It is safe to say that the practical solution of the headlight problem is near at hand, judging from the findings of the committee of the Society of Automobile Engineers which has had the subject in hand for some time past."

This is the belief of President H. W. Rowe of the American Automobile Association, a committee from which organization attended the electrical equipment session of the recent Standards Committee meeting of the Automobile Engineers, held in Washington, D. C., at the U. S. Bureau of Standards.

"Reports from A. A. A. clubs throughout the country indicated drastic legislative action in several states unless some concrete solution was put forward by the motor car owners," says President Rowe, "and this caused our Legislative Board chairman to call upon the Society of Automobile Engineers to give the headlight problem the right of way over other questions upon which it is at work. Chairman Yellott will draft a model bill as soon as the Engineers complete their report and the measure will then be available for introduction in the states which are threatened with undigested regulation.

"The automobile manufacturers have put the situation up to the lamp makers who, through their as-

sociation, are cooperating with the society, which is so near a solution that a report is promised before the first of the new year, when many of the State legislatures begin to assemble. Not a few fairly satisfactory devices for glare elimination have been put on the market and have found the approval of the officials entrusted with law enforcement in several states. Unfortunately on many cars the devices not only eliminate the glare but also smother the light to such an extent that the road is not sufficiently illuminated.

"Equally important, in my opinion, in reducing accidents to a minimum, is the control of the careless pedestrian, who must be required to exercise due care and caution on the streets and highways and must cross at the properly designated crossings. I realize the opposition which this idea will meet in some quarters, but its adoption is inevitable and will prevail despite the first out-burst of unpopularity. We are for safety-first, but the pedestrian must assume some of the inconvenience in our progress toward the making of ideal traffic regulation."

### Seeking the Standard Type.

Arising out of the Mexican agitation comes a growing appreciation of the importance of good roads as an aid to military defense. Because of the stupendous upheaval of the European war, with its startling agencies of destruction, and because of the unpreparedness of our country to defend itself against attack, there has begun a great awakening of our people. In the minds of many there has been confusion as to just how far or along what lines preparation should be prosecuted. From one quarter comes a call for additional naval equipment; from another a greater army, harbor and coast defenses. But there is one phase upon which all seem to be agreed, and that is the movement for more and better roads.

Here in America one road after another has been tried with more or less success and opinion and practice have crystallized in favor of a combination road. Highway engineers are unanimously agreed that successful road building must include a stable foundation and a wearing surface suited to all types of traffic and involving low maintenance charges. There are just two types of roads within the resources of prosperous communities which can be so combined as to meet these requirements, and at a cost not exceeding that paid for these highways when built as separate or distinct types. They are the asphalt macadam road and the concrete road, which are cheaper, stronger and more satisfactory when properly combined in the form of a concrete foundation and a natural asphalt macadam wearing surface.

When roads are of the asphalt macadam type, any defect in the foundation causes trouble. When roads are built of concrete throughout, any neglect or carelessness in workmanship is fatal.

But when concrete is used as a foundation, the asphalt macadam wearing surface acts as a water-shedding material, keeping conditions more constant, both as to moisture and temperature changes. The unyielding concrete in turn keeps the asphalt macadam wearing surface from breaking down. Furthermore, the latter imparts to the road the resiliency or elasticity required for both horse and motor traffic.

The exigencies of war have proved the absolute necessity of standardization. It was left for this country to evolve a standard type of road, a road dependable in time of peace and war built from materials of known efficiency.

## American Road Builders Meet

THE ANNUAL MEETING of the American Road Builders' Association was held on Friday, November 3, at the Automobile Club of America, New York, N. Y., and was preceded by a meeting of the Board of Directors. The meeting was called to order by Col. E. A. Stevens, State Commissioner of Public Roads of New Jersey, President of the Association.

Reports read by the Secretary, E. L. Powers, showed the organization to be in flourishing condition. The report of the executive committee outlined plans for the annual convention of the association, which will be held in Boston, Mass., during the week beginning February 5, 1917. The Eighth National Good Roads Show will be held in conjunction with the convention and, according to the committee's report, promises to be the most successful affair of its kind ever undertaken by the association.

The meeting was followed by the annual "Get-Together" dinner of the organization, which was held in the grill room of the Automobile Club of America and was attended by upward of 100 members and guests. The result of the ballot for officers, which had been conducted by mail, was announced at the dinner as follows:

President, Arthur W. Dean, Chief Engineer, Massachusetts State Highway Commission; First Vice-President, William H. Connell, Chief, Bureau of Highways and Street Cleaning, Philadelphia, Pa.; Second Vice-President, Austin B. Fletcher, State Highway Engineer of California; Third Vice-President, Arthur H. Blanchard, Professor of Highway Engineering, Columbia University, New York; Secretary, E. L. Powers, Editor, of "Good Roads"; Treasurer, W. W. Crosby, Consulting Engineer, Baltimore, Md.; Directors for three years, T. R. Agg, Professor of Highway Engineering, Iowa State College, Ames, Ia.; W. E. Atkinson, State Highway Engineer of Louisiana; Fred E. Ellis, Manager, Essex Trap Rock & Construction Co., Peabody, Mass.; E. H. Gillespie, Chief Engineer of Sewers and Highways, Borough of the Bronx, New York City; B. Michaud, Deputy Minister, Department of Roads, Province of Quebec, Canada; Paul D. Sargent, Chief Engineer, Maine State Highway Commission.

Col. E. A. Stevens, State Commissioner of Public Roads of New Jersey, the retiring president of the association, acted as toastmaster. The principal speaker was Edwin Duffey, Commissioner of Highways of the State of New York.

Commissioner Duffey spoke on the matter of federal aid for highway construction, with especial reference to the state of New York. He said that, as the legislature was not in session at the time the federal aid bill was passed, no provision had been made for meeting the requirements of the bill. In his opinion, existing highway funds could not be used to meet the federal appropriation, inasmuch as the uses of such funds were specifically provided for in the laws governing the bond issue by which the funds were raised.

He believed, however, that means would be provided, from other sources. The allotment of federal funds to which the state was entitled, in round figures about \$4,000,000. In this manner the state would have an extra fund of approximately \$8,000,000 which, he believed, should be used to complete gaps in the state highway system and to build important roads which were not provided for from the existing funds.

Nelson P. Lewis, chief engineer of the Board of Estimate and Apportionment, New York City, spoke on the growing congestion of traffic due to the increasing width and capacity of motor vehicles. Mr. Lewis advanced the opinion that the only effective means of preventing the increasing damage inflicted upon road surfaces by heavily loaded motor trucks in the enactment of drastic ordinances, limiting the weight of the load per inch of tire width.

Another speaker was Alfred Reeves, General Manager of the National Automobile Chamber of Commerce. Mr. Reeves scored inadequate salaries paid to highway engineers and deplored the injecting of politics into highway and street work. He assured the association of the willingness of his organization to co-operate in all matters relating to the improvement of highways.

Maximilian Groten, mechanical engineer of the Imperial Russian Railways, told of the lack of means of communication in Russia, stating that only about 40,000 miles of highways exist in the entire empire. He spoke of the wealth of Russia in the soil, but stated that the absence of a system of highways interfered seriously with its development. Mr. Groten bespoke the interest of American engineers and capital in Russian highway construction.

Col. Stevens spoke about the work of the American Road Builders' Association and its influence upon the movement for improved highways, recommending that the organization devote its attention principally to the study of the technical problems relating to road building.

Others who spoke were, Franklin Q. Brown, Chairman of the Good Roads Committee of the Automobile Club of America; H. Elting Breed, First Deputy State Highway Commissioner of New York, and Arthur W. Dean, the president-elect of the association.

### Circular Highway Planned.

That the plans of the Roanoke Automobile Association and the Roanoke Rotary Club for a circular motor highway from Indiana and Ohio through Tennessee, Virginia, Maryland and Pennsylvania were brought one step nearer realization by the road meeting in Lexington on November 11 is the unanimous opinion of the members of the association who attended the meeting.

The plan is for a circular route starting in Indiana and Ohio along the Dixie Highway to Knoxville. At this point the route will leave the main artery and turn eastward to Bristol and Roanoke. From Roanoke it will follow the National Highway to Staunton and then run along the famous old Valley Turnpike to Washington. The road from Washington to Pittsburg is in excellent condition, while from Pittsburg west the Lincoln highway is rapidly nearing completion.

The chief advantage in this route is that the tourist does not penetrate the far South and escapes the heat of the spring, summer and fall months, when most motorists prefer to take their trips. As most of the way leads through cool mountain country, the tourist is assured of a pleasant trip.

A plan is now being agitated in Virginia counties for the construction of an automobile highway from Norfolk to Richmond.

# The Problems of Street Traffic

## Abstract of Remarks of NELSON P. LEWIS, at the "Get-Together Dinner" of the American Road Builders' Association, November 3, 1916

**A**MONG the most difficult problems presented to road builders and road planners is that of street traffic. The increases in the volume of this traffic has been almost sensational during recent years, especially since the use of the motor vehicle became general. While this increase is quite obvious in all cities, the statistics in street traffic in London are unusually complete and the reports of the London Traffic Branch of the Board of Trade bring out some remarkable facts. The number of horse-drawn cabs licensed by the Metropolitan Police decreased from 11,404 in 1903 to 2,385 in 1912, while during the same period the number of motor cabs increased from one to 7,969. During the same period the motor omnibuses increased from 13 to 2,908, while the 3,623 horse-drawn omnibuses in 1903 have entirely disappeared. Some remarkable statistics are given as to the number of vehicles passing certain points at certain hours and during the day, but the surprising feature of these statistics is that the total number of vehicles licensed in 1912, including tramway cars, was actually 203 less than in 1903. No better illustration is afforded of the enormous increase in the service rendered by motor vehicles owing to their higher speed and greater flexibility.

On certain streets of all busy cities the number of vehicles is so great and the resulting congestion is so serious that students of this problem have become much alarmed and are discussing the need of more effective traffic regulation. The easiest solution of this problem appears, however, to be the better diffusion or distribution of traffic and this can in no way be more effectively brought about than by a better and more uniform standard of improvement of the roadways of both urban and rural highways.

Why is it that so many drivers of vehicles tend to use the same street when many different possible routes could be followed? Undoubtedly the chief reason is that they wish to get the streets that are best paved. In the race of the motor vehicle a slight detour with corresponding increase of distance is of little consequence and time will actually be saved by the avoidance of traffic congestion, but those who are riding, especially for pleasure, prefer to follow the streets that are most attractive, those on which the abutting property has been improved to a higher degree and in a little more sightly manner. When our streets shall have been improved according to better standard—not necessarily with palatial homes, but with good taste—when tree planting is taken up more desirously as when the space not seeded for roadways and foot paths is devoted to grass plots or planted with shrubbery, those with whom time is not the important element will follow these streets, now given over wholly to the delivery wagons of the milkman, the grocer and the butcher, and appreciable progress will have been made in the solution of the traffic problem. There is, however, a very serious problem which has grown out of those of motor vehicles, namely the increasing weight, the increasing wheel loads and the increasing size of these vehicles. The motor or the tractor can overcome grades with heavy loads which were impossible to the horse-drawn vehicle, and highway officials responsible

for the maintenance of our city streets and of the country highways leading out of them are greatly concerned at the damage inflicted upon road surfaces by these loads. The only effective remedy appears to be the enactment of drastic ordinances and laws which will absolutely prohibit the use of vehicles having more than a specified load per inch width of tire, and that load should probably be less for steel tires than for rubber tires.

The width and length of such vehicles is a matter of serious concern, especially on city streets. The roadways have been designed to accommodate a certain number of lines or traffic and the number of lines is reduced through an increase in the width of the vehicles, the capacity of the roadway is reduced in still greater proportion and, if this increase in width is allowed to proceed, very costly street widenings will become necessary. In this case also it would appear to be necessary to prohibit absolutely the use on our highways of vehicles having more than a certain specified width. The State Legislature of Pennsylvania in 1913 passed a law prohibiting the registration of motor vehicles exceeding 90 inches in width of loads and vehicle combined, except that motor buses for carrying passengers may be used within the limits of cities of the first, second and third classes having a total width of 100 inches. The law also prohibits loads in excess of 24,000 lbs. for vehicles and load combined or in excess of 10,000 lbs. gross load on any axle, or 750 pounds for each nominal inch width of solid tire.

Fortunately, the tendency of the manufacturers of motor trucks appears to be in the direction to more moderate loads. Of 221 manufacturers producing commercial vehicles at the beginning of the present year 133 confined themselves to those of less than three tons capacity. Of the 82 manufacturers offering trucks of more than three tons capacity 12 appear to have increased this capacity in their models for this year, only two of these increases being the six tons, while six have decreased the capacity of their trucks, one from four to three and one-half tons, three from five to three and one-half tons, one from six to four tons, and one from seven and one-half to five tons. Of 12 newcomers in the field only one offers a truck with a capacity of six tons and two of five tons, while the rest provide for smaller loads.

While the imposition of an absolute limit upon wheel loads and upon the dimensions of vehicles seems necessary to preserve our highways, both in the city and country, the development of the motor vehicle appears on the whole to present no problems to highway officials, especially problems relating to street congestion, which will not solve themselves with the more general improvement of our streets and roadways and with the adoption of a higher standard of real estate development which will make the subsidiary highways more attractive to those using motor vehicles.

The annual meeting of Alabama engineers was held in Birmingham last month. State Highway Engineer W. S. Keller, a brother of the noted Helen Keller, was one of the speakers.

# Jackson Highway to Mississippi

## Decision of Pathfinders After Warm Session---Another Meeting in Interest of Harmony

**A**FTER a spirited and lengthy debate the trail leading directly to New Orleans from Nashville was designated as the permanent Jackson Highway south of Nashville by directors of the Jackson Highway Association at the Seelbach Hotel in Nashville, November 20.

The trail chosen is known as the Mississippi route in contradistinction to the Alabama route which was a candidate for the name. The Mississippi route includes Florence, Columbus, Meridian and Hattiesburg. The Alabama route branches from the Mississippi route at Columbia, Tenn., and includes Cullman, Birmingham, Montgomery, Selma and Mobile on to New Orleans.

Another way of reaching the Alabama route proper is by leaving the Mississippi route at Nashville, and swinging to the southeast to Shelbyville and from there due south to Huntsville and from Huntsville to Decatur, where the main Alabama line touches.

The Mississippi route was recommended to the directors by the Pathfinding Committee which traversed both routes and the Nashville-Decatur way to the Alabama route.

Following the association's decision to accept the Mississippi route, Peter Lee Atherton, chairman of the Board of Directors, offered two resolutions, one to extend an arm of the Jackson Highway to Montgomery and the other to place the sense of the board as opposed to any loop route on the Highway.

Mr. Atherton's first resolution was met with a storm of protest by directors who championed the Mississippi route. Insinuations that "It was a one-man convention" and that the "cards were stacked" were made. The heated controversy that ensued was extended to such a late hour that directors voiced apprehension of missing their trains and as the breach between Alabama and Mississippi factions was broadening visibly, the board voted to adjourn "to think it over" for a period not longer than ninety days and to meet at Birmingham to pass on the resolution. A fight by the Alabama delegation to table the motion was lost by a vote of thirteen to eleven. Louisville, Fairfort, Nashville, Birmingham and New Orleans were suggested for the next meeting place.

Miss Alma Rittenberry, of Birmingham, who conceived the idea of establishing the highway as a memorial to Andrew Jackson, invited the board, in behalf of the Birmingham Chamber of Commerce, to meet in that city.

Capt. John Craft, of Mobile, holding the proxy of E. B. Duntun, of Mississippi, proposed that all three routes traversed by the Pathfinding Committee be designated as the Jackson Highway.

J. B. McBeath, of Meridian, Miss. Road Commissioner, urged the board to adopt the Mississippi route, the one recommended by the Pathfinding Committee as the only Jackson Highway south of Nashville. Mr. McBeath, Mr. Spraggins and Capt. Craft offered the routes they favored to the board in the form of motions.

Mr. Craft's motion was considered first and was lost by a vote of thirteen to eleven. Mr. Spraggins motion was lost by a vote of fourteen to ten. Following

the announcement of this vote, Mr. Spraggins said that a "yes and no" vote on the Mississippi route was not needed and by acclamation this route was designated as the Jackson Highway.

The Alabama delegation asked that the loop route be chosen on the grounds that the hard work done on Alabama roads deserved some recognition and reward.

The Mississippi delegation opposed this stand on the ground that the two factions were given one year in which to put the two large competitive routes in order with the understanding that the one recommended by the Pathfinding Committee was to be given the name, Jackson Highway, that the Mississippi route had received this recommendation and that it deserved sole title to the name and rather than share it with another route would relinquish all. This delegation emphasized the point that if all routes south of Nashville were to be known as the Jackson Highway there would be no Jackson Highway. Mississippi directors indicated they would join the Dixie Highway or some other highway. The Alabama delegation answered that if it did not share in the name it would have no other incentive than to join some other highway. This point, also, was mentioned by Mr. Atherton in his resolution to extend an arm of the highway to Montgomery.

Directors were given an "Old Hickory" luncheon at the Seelbach rathskeller by the Louisville Board of Trade. Thomas Floyd Smith, president of the board, presided at the luncheon. Addresses were made by Mr. Atherton, Miss Rittenberry and several directors. The talks divulged the information that more road building was accomplished in the South last year than in the ten years preceding.

### Some Coming Road Meetings.

December 11-13—Portland Cement Association—Annual meeting, New York, N. Y. Assistant to General Manager, A. H. Ogle, Chicago, Ill.

January 16-18, 1917—Virginia Road Builders' Association—Sixth annual meeting, Norfolk, Va. Secretary, C. B. Scott, Richmond, Va.

January 20, 1917—Western Brick Manufacturers' Association—Meeting, Kansas City, Mo. Secretary G. W. Thurston, 416 Dwight Building, Kansas City, Mo.

February 5-9, 1917—American Road Builders' Association—Fourteenth Annual Convention; Seventh American Good Roads Congress under the auspices of the A. R. B. A., and Eighth National Good Roads Show of Machinery and Materials. Mechanics' Hall, Boston, Mass. Secretary, E. L. Powers, 150 Nassau street, New York, N. Y.

February 7-15, 1917—Tenth Chicago Cement Show—Coliseum, Chicago, Ill. Secretary, Blaine S. Smith, 210 South La Salle street, Chicago, Ill.

Denton county, Texas, will vote December 24th on a bond issue for a million dollars. A recent proposed issue was defeated.

The state of New Jersey will have available for state highway building seven million dollars as the result of the action of the voters in the recent general election.

### Federal Aid for Rebuilding.

The Federal Government is cooperating with the road authorities of the counties in the flood district of Western North Carolina and the state highway department in the reconstruction roads and bridges destroyed by the recent floods on the Catawba, Yadkin, Broad and French Broad rivers. The North Carolina highway department has had a large force of men in this section from the time the waters subsided and these reported that at least a million and half dollars damage had been done to bridges and roads, the larger amount being caused by bridge destruction. Congress appropriated \$540,000 for relief work in the states worst hit, the larger amount of which goes to North Carolina. A goodly amount of this is expected to be expended in assisting the counties to rebuild at once the fine roads that opened the mountain country to extensive traffic. In this way work will be provided for those who lost their possessions in the high waters and will enable them to tide over the winter.

The first road to be opened was the Spartanburg-Asheville highway by way of Saluda mountain, South Carolina counties furnishing valuable aid in the work of repairing the damage. It will be some time next spring before the Charlotte-Asheville highway is again in good condition, although a limited amount of traffic will be done over this road in the late fall. The Central Highway over the Blue Ridge at Old Fort will also likely be done next spring and the mountain sections opened in all directions with the coming of another resort season. The road from Hickory to Blowing Rock was the first to be placed in condition and full travel was resumed shortly after the floods. This is the route of the Boone Highway and by next spring and summer it will open the "land of the sky" from the Tennessee side.

### The Outlay for Virginia.

The report on roadways in Virginia by State Highway Commissioner George P. Coleman is as follows:

"The State Highway Commission of Virginia was formed just ten years ago, and constructed during the first two years some twenty-two miles of improved road. Since that time, however, the work of the department has increased by leaps and bounds. During the last fiscal year we constructed a total of 846 miles of all classes of road, and since the organization of the department we had constructed up to the 1st of October, 1915, a total of 3,762 miles, this mileage scattered through the 100 counties of the state. During this year we expect to construct approximately 800 miles of road. The short sections of road which have been constructed in the various counties are gradually being connected up, giving us a thorough system of state roads.

"The last legislature appropriated for road purposes approximately \$650,000. In addition to this, counties and districts have voted bond issues for the present year's work of \$2,500,000, making a little over \$3,000,000 available for road construction purposes during this season. In addition to this, we expect to have available from the Federal government Virginia's proportion of the Federal appropriation for road purposes. This bill, which was drafted by the executive committee of the American Highway Officials' Association, was passed by this present Congress. Funds from this source will be available during this season.

"The Virginia Legislature has recently realized the importance of the maintenance of its highways after their construction, and has set aside the funds derived from

the automobile licenses for maintenance purposes. These licenses will amount to approximately \$250,000 for the coming year, and, as the law requires that the counties shall put up an equal amount, this will give us, available for maintenance purposes, approximately \$500,000.

"We are at the present time at work on several through routes, North and South and East and West. We are just connecting up a link in the Richmond-Washington Highway, and expect to have this road open for traffic in the latter part of the fall. We have already constructed a road from Richmond via Petersburg and Clarksville to the North Carolina line; also a branch from this road going down into Eastern North Carolina. In addition to this, we have about 100 miles of good turnpike from Winchester, south from Harrisonburg and Staunton, and are extending this road towards Natural Bridge, and hope ultimately to carry it on south to the North Carolina line, connecting it up with the lines east and west. We are also building in a number of places on a through road from Norfolk, Va., to Bristol, on the edge of Tennessee, and from Bristol we are building north to a road from Graham, Va., to Cumberland Gap, in Kentucky. This, with a number of short lines connecting up the important towns, will give the state a most satisfactory system of state roads. Unfortunately, on the lines east and west there are a great many missing links, but for fully eight months of the year tourists will find the roads of the state in fairly good shape, even on the unimproved connections."

### "Safety First" on Highways.

Safety on highways ought to receive more attention. Speed fiends and drunken drivers are already attended to by laws, but there are many very real dangers which have received no attention. One of these is the road intersection where the thick shrubbery or trees make it impossible for the driver on one street to see an approaching vehicle on the other until the two are ready to collide. Slow driving is of little avail in such places. The only remedy is to clear away the obstructions to sight, as is required by regulation in some places. Another danger spot is the narrow road with sharp curves where it is impossible to see ahead on account of shrubs and trees. Automobiles have considerable trouble at times when they meet on such curves, but the danger to them is by no means so great as it is to the young man who is holding his best girl in a buggy and neglecting his horse. Such an obstruction in the center of a narrow, winding road is not quickly guided to the side where it belongs. Underbrush ought to be cleared away on the inner sides of such curves, at least so the driver can detect another vehicle on the road ahead before it is nearer than seventy-five feet. This does not require the destruction of shrubbery or trees, but merely enough thinning out of the growth to enable a carriage or motor car to be seen. Still another danger point is the junction of a road with another at right angles, concealed by an intervening rise or curve so that the junction point is not seen until just before the moment when the driver on the joining road must turn into the main road. Such places are extremely dangerous, and signposts should be erected to warn the traveler of their proximity.

Ocmulgee county, Okla., joined the progressives at the recent general election by voting \$800,000 in good roads bonds.

# GOOD ROADS NOTES

## GATHERED HERE *and* THERE

### California.

R. M. Morton, who had charge of the construction of San Joaquin county's \$2,000,000 system of improved county roads, has been engaged to superintend the construction of Sacramento county's \$1,750,000 system of concrete base roads for which bonds were recently voted.

Under the direction of Engineer Morton, work has been started in Sacramento county preparatory to the letting of contracts. The driving of the first stake on the Greenback Lane road that started the survey for the system of good roads in Sacramento county was made quite an occasion recently. George W. Peltier, president of the Sacramento County Good Roads Association, wielded the hammer on the stake. Engineer Morton was on hand with his surveyor's transit to spot the location.

The Sacramento Bee says:

Favored by ideal weather the surveying crews working under the direction of R. M. Morton, in charge of the construction of county roads under the \$1,750,000 bond issue, continued their work on the Greenback Lane and the Lower Stockton Road near Franklin.

The surveying that the engineers will be able to do before the winter rains set in will enable the county to award contracts and start the actual construction of about 50 miles of paved road next spring.

\* \* \*

### Illinois.

Ten million dollars will be the appropriation asked of the next assembly of the Illinois legislature for good roads, according to a resolution passed at the annual meeting of the Egyptian Trail association, the Chicago to Cairo highway, held in Mattoon recently.

The resolution provides for a joining of interest of the Egyptian Trail association, the National Old Trail association and the Lincoln Highway in Illinois, petitioning the legislature to grant a special election for the purpose of issuing bonds in the amount above stated for building hard roads on the routes above mentioned in Illinois, to be built under the auspices of the state highway commission.

Each vice president of the three organizations in Illinois is to circulate petitions to this effect, the same to be forwarded on completion to the president of each highway division.

\* \* \*

### Kansas.

A marked improvement in Kansas road is noticeable in all parts of the state and especially in those counties where the road work has been placed under the direct supervision of a county engineer. "County boards are beginning to realize that their many other duties make it impossible for them to give proper attention to the county roads," said W. S. Gearhart, state highway engineer. "Where the county engineer and county boards work co-operatively much good work is done and it is done more efficiently than could possibly have been done by the board alone. Under this system, now being carried out in a number of the counties, the county board determines what road work shall

be done and the county engineer is made directly responsible for carrying out their plans.

"Sentiment in favor of better roads for Kansas is increasing rapidly because so many persons have had opportunity to observe what other states are doing along this line. The earth roads in this state are the best in the country, but it is hard to keep them in repair, especially in wet seasons. The summer rains of 1915 caused the bottom to drop out of our earth roads and they are just now being brought back into their former condition. Roads are being built with the idea of permanency. In many communities temporary makeshifts are no longer tolerated. Cement culverts replace dilapidated bridges and all other road improvement is of a more durable character than formerly.

"Kansas now has an average of one automobile for every mile of road and if the state expects to keep pace with this increasing traffic the main traveled roads, sooner or later, must be surfaced with durable materials. Of all the different kinds of material available for road surfacing gravel probably is the best for Kansas conditions so long as the traffic does not exceed 200 vehicles a day. When the traffic increases beyond this number brick or cement is the best material. Gravel deposits are numerous throughout all of that part of Kansas east of a north and south line through Solomon. This fact makes gravel the cheapest surfacing material. Because it is so plentiful and so easily obtained, it is cheap in respect to both first cost and maintenance."

\* \* \*

### Oklahoma.

Advocates of good roads are confidently expecting the Ozark Trail convention which met in Oklahoma City November 21-22 to inaugurate a period of good roads building in Oklahoma that will certainly eventually place this state in the list of those known as good road states. Wherever these conventions have been held a desire for better roads has followed—a desire that has been backed up by action.

In the twenty-seven years of its existence the people of this state have been so busy establishing themselves that state development, including road building, has been left largely to take care of itself. From following Indian trails and cow paths in the early days to the time when farmers of the new state laid out and made passable roads on section lines, this important branch of state building was pretty much haphazard business. During the last few years many sections of the state have begun to follow systematic methods in road building, but until automobile travel became such a factor in business of the state and of communities has real road building taken on a state-wide significance.

At this time three routes from northeast to southwest paralleling each other are in competition in an effort to secure the official mark of the Ozark Trail which will be a link in a trans-continental highway. This mark is keenly sought for the heavy automobile travel and its consequent prosperous results. Each of these three routes are scenes of activity, and it is said by

those in a position to know, that more than 1000 miles of very excellent roadway is bound to be the result. The routes that lose the official mark will win good roads. Much of the work on the roads between Oklahoma City and Amarillo is completed and ready for the inspectors. Before June, however, when the inspectors go over these routes, the enterprising road builders assert, these roads will each be like boulevards.

Rivalry between the tentative routes between Tulsa and Oklahoma City is no less keen, although at this time the work of putting the roadways in shape is not so far advanced. Organizations in every town on each of the three competing lines have been perfected and work is going forward rapidly. Many miles of these good roads are now in a high state of excellence.

\* \* \*

### Virginia.

Upon invitation of the Good Roads Association of Rockbridge county, a largely attended meeting was held in Lexington Nov. 11th, delegates being present from Augusta county, Staunton, Rockbridge, Botetourt, Roanoke, Lynchburg, and several counties of south-west Virginia. The delegation from Roanoke, one hundred and fifty strong, and headed by John Wood, secretary of the Roanoke Chamber of Commerce, came on a special train.

The convention was presided over by Hon. William A. Anderson, and was addressed by John Wood, of Roanoke; Supervisor J. S. Callison, of Augusta county; Colonel Brown, of Roanoke county; Hon. Joseph Turner, of Roanoke; Senator C. T. Jordan, of Staunton; Hon. H. St. George Tucker, of Lexington, and several members of the Board of Supervisors of Rockbridge and Botetourt counties.

W. F. Ficklin, Jr., representing the Staunton Business League, was also present.

The sentiment was unanimous in supporting a scheme for a national highway to run through the Valley of Virginia and on through southwestern Virginia to the Tennessee line.

The two main objects of the meeting were to take steps to promote this plan and to encourage good roads sentiment in the counties represented. The addresses all bore upon these phases of improvement and it was unanimously resolved to promote the construction of a national highway through the Valley to the Tennessee line and, looking to the accomplishment of that end, to favor the immediate building of all necessary links between Staunton and the Botetourt county line.

These links are short and the voters of one district in Rockbridge county have already voted bonds to be used in building one of these links.

There is also a short link in Augusta county, running from "Folly" on the Greenville road to Lexington, and a large link south of Lexington in Rockbridge county.

The entire meeting was an enthusiastic one, the speeches earnest, and a profound interest was exhibited in the subject under discussion.

Dallas, Texas, road authorities are getting ready to spend a half million voted in the recent election for building culverts and raising roadbeds in lowlands.

Augusta County, Va., farmers have formed dirt road drag clubs. The county furnishes the drags and the farmers the teams and do the work.

### Atlantic Highway is First.

First to be completed of the big border-to-border routes will be the Atlantic Highway, according to figures recently compiled by the Touring Information Board of the American Automobile Association. East of Portland, Me., and from Quebec, Can., to Miami, Fla., there is now less than 100 miles of unfinished highway, in this distance of more than 2,000 miles. Of this 100 miles there has been about 11 in Virginia, divided into three sections, that was vicious, with none of the balance particularly bad.

The Washington (D. C.) Bureau of the Touring Board now reports that a new road has been completed for one of these sections; a second section is now being rapidly put into good traveling condition, and the contract let and work started on the third section, which was the worst of all, being that section known all over the country as the Choppawamsie swamp. In the meantime the "swamp" road has been put into passable condition and is accepting several score of cars per day. State Road Commissioner Coleman of Virginia has given the bad stretches his personal supervision.

The Atlantic Highway being the main artery for the North and South travel in the fall and spring, was used by several thousand tourists, during the past season, who tempted fate in the trip through the "swamp," many of them being pulled through. All indications show that this season will see an enormous increase in the travel, particularly as the information is rapidly spreading that the trip south from Washington has been robbed of its terrors.

Another dreaded section was the Ogeechee Swamp, south of Savannah. This now has a fine treated macadam highway for its entire 8 miles. For the Florida East Coast trip there is a shell and brick highway, except for 4 miles, from Jacksonville to Miami, Florida now has a State highway department, and Chairman Scott and Commissioner Coker predict that with numerous county bond issues the state soon will have a connected road system.

### Early State Aid Roads.

It is often said that the use of state money for the construction of roads is of quite recent origin. The New Jersey state aid law of 1891 is sometimes referred to as the first instance of such use of state funds in this country. As a matter of fact, state money was spent for such purposes more than seventy-five years ago. Kentucky paid out over \$2,000,000 for road improvements between 1820 and 1840, under the direction of a state highway engineer who drew a salary of \$5,000 a year, a very large sum for those days. The roads built then were 24 to 30 feet wide between the ditches. The surfaces were constructed of broken stone and the bottoms were of large stones wedged together to make what roadbuilders call a Telford foundation. About 1850 business conditions in the country became bad and this work stopped. When it was resumed in 1908 such a long period had elapsed since the earlier state-aid work that 1908 is usually fixed as the beginning of state roadwork in Kentucky.

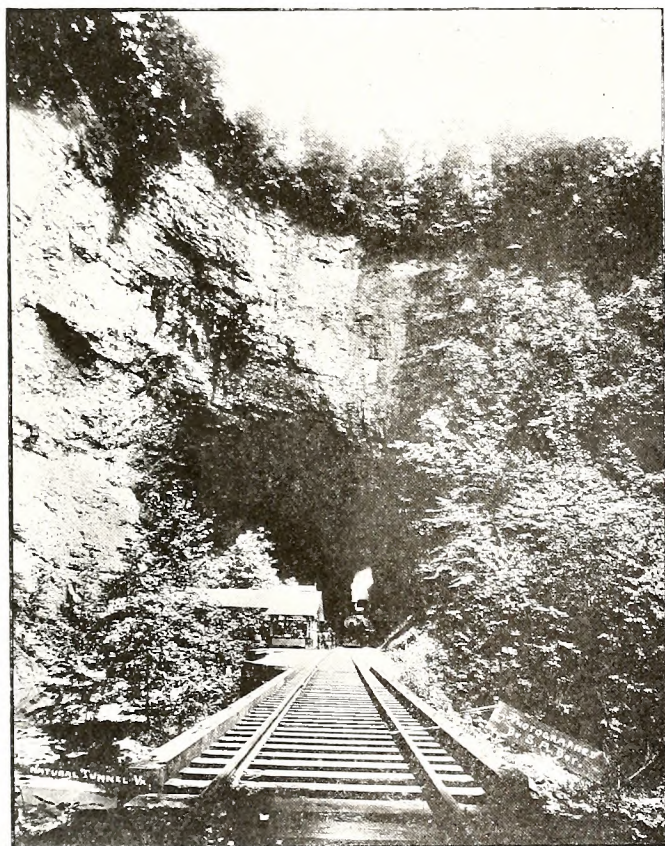
Many rural letter carriers organizations have entered a protest against the possible usage of all Federal aid funds and their state duplicate upon trunk lines. They want a portion diverted to cross country roads in order that the post road system may more widely benefit.

# How to Use Convicts on Roads

By **GEO. P. COLEMAN**

**State Highway Commissioner of Virginia**

**N**ATURALLY what is done to improve the condition of a convict as a prisoner will make for the improvement of the prisoner as a citizen. We have to temper our punishment of, and our mercies to, him with justice. In executing the law it is our duty to use our utmost endeavor to return him to society better able to cope with the conditions which will confront him when he regains his freedom. After nine years of experience I believe that the solution of the prison question—certainly in Virginia—is to use the men in the construction and maintenance of our roads. In road work there is little or no competition with free labor.



The Natural Tunnel in Virginia—on Boone Way. Creek and Railroad Both Go Through Tunnel

The work and the healthy out-of-door life tend to build him up physically. Training him as an expert in handling road-building machinery places him in a position to earn an honest living after his confinement. The work on which he is engaged is one of pressing need to the public and creates in the worker a kind of pride in his own usefulness.

The prison population may be divided into four classes; 1, long term and dangerous men; 2, short term convicts and jail men; 3, trustees, both convicts and jail prisoners; 4, paroled men.

Class 1, men should be dressed in stripes and worked under guard in stockades in state stone quarries or gravel pits located on railways serving a district where road construction is in progress. These convict-oper-

ated quarries should furnish stone to the counties for road purposes at cost. To secure an economical distribution of this material, very low transportation rates are necessary; in Virginia we have always found the railway companies ready to cooperate with the highway department in its work, for they realize that the highways are the feeders of the railways and that the development of the two goes hand in hand.

Class 2, men should have some distinctive dress (not striped) such as blue or brown. These men should be distributed to the various state road camps and worked under guard in the construction of county or district roads. A small daily sum should be paid to them by the county, one-half each month and the other half retained and given to them on the completion of their sentence, to insure their having some money when released.

Class 3 men, the trustees, should wear ordinary khaki suits and be worked without guards, either in camps composed entirely of trustees or as drivers, cooks, enginemen, machine operators or concrete workers in other roads camps. They should be paid a little more than the class 2 men, and their pay should be graded according to the character of the work they perform. They should be paid in the same manner that the class 2 men are paid.

Class 4 men should wear ordinary clothing and be used as patrolmen or in gangs on the maintenance of roads built under state supervision. They should be furnished with proper quarters and be paid a monthly salary by the county in which they are working. Paroled men under this system are made a part of the state and county free labor road force, the only special feature about them being that they must report monthly to some general head and be governed by the states' parole laws.

Many prisoners are now being trained in road construction and it follows that they can use the knowledge thus obtained in the maintenance of roads. The state thus not only gains the benefit of their work during their terms but also trains them for useful service when released. There are a number of instances where prisoners who worked on roads have been employed by contractors as free laborers, by farmers who watched them while engaged on the road work, and by county authorities.

The success or failure of convict labor on road work depends on the man in charge. But with a firm man who keeps his department out of politics, this procedure insures the improvement of both the criminal classes and the roads.

J. Wallace Alexander has recently been elected president of the Louisiana Good Roads Association, following his appointment as member of the state highway commission. Alexander was father of the Alexander good roads bill.

Logging has been begun on a highway to connect Marysville, Kansas, and Sioux City, Iowa, a distance of 230 miles.

### Alabama May Build Own Road.

The decision of the Jackson Highway Commission, in giving the route to Mississippi, did not appear to perturb the Alabama state highway officials. The findings of the commission was looked upon philosophically, and it was stated that the people of northern Alabama could build their own road, independent of any conclusions reached.

Alabama now has many good roads in the northern part of the State as well as in other sections, and it can build a highway of its own from here to the southern end of the State, connecting in the bad places with the good roads of the commonwealth.

The route of the Jackson Highway, which runs to Pulaski, in the southern part of Tennessee, can be picked up from there, running into Athens, in the northern part of Alabama, thence to Albany, in Morgan county, to Birmingham, Montgomery, Selma, Thomasville and Mobile.

The State and counties through which this good road would run, simply would have to put up as much money as the Federal government allows in its state aid appropriation for roads. It would be a long stretch of road through the State, independent of the Jackson Highway route.

It has been suggested that it be called the Satsuma route, named after the orange now becoming famous in southern Alabama, specimens of which were recently received in the office of the State commissioner of agriculture, grown in Washington county, that State, which are pronounced equal, if not superior, to those grown in any other section of the country.

It was stated at the capitol that the decision of the Jackson Highway Commission would have the effect of spurring the people of Alabama in building a road of their own. The route suggested is an excellent one, the only difficulty being a 24-mile stretch of road in Washington county, where the road branches off from Clarke county. It will be necessary to go into Washington county to make an easy crossing of the Tombigbee river. If the road went farther south in Clarke county, it would be hemmed in by the Tombigbee and Alabama rivers.

Washington county, it is stated, is not very thickly populated and there is not any too much money there, but ways and means eventually could be devised to raise the funds for the 24-mile stretch.

### How Mississippi Folks Regard Road Improvements.

Many of the main roads of Lauderdale county, Miss., have been improved with the proceeds of bond issues and are kept improved by an annual road maintenance tax. A local paper sent inquiries to many of its subscribers for their views on the improvement, and the following is a typical reply: "I live 4 miles from the city and 2 miles from the school. This has been the worst winter I have ever seen, but there hasn't been a single day when my children haven't walked to school and not a single day have they come home with wet feet; and to think they walked down the middle of the road! Not one of them has been sick with a cold even, while heretofore my doctor's bills have been more than my road tax. Talk to me about paying taxes to build roads! I am willing to pay taxes on my pack of foxhounds, my bird dog, my chickens, my horses, and, if necessary, my wife and children, if they will use it in extending roads like this all over the country; I would rather have my house and 10 acres of land on this road like it is now than have my whole farm on

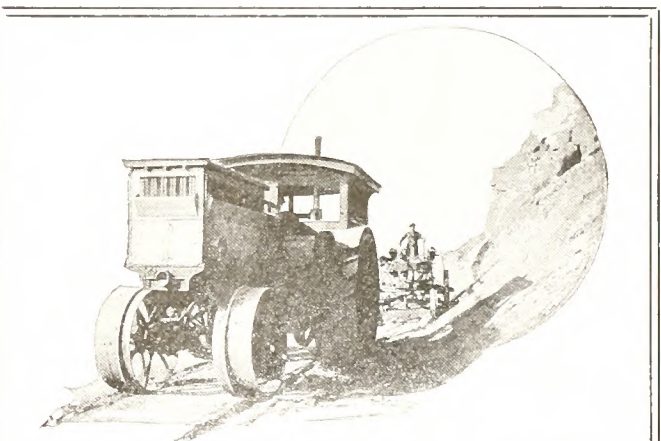
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the old road like it was before improvement." And here is a typical letter from a man on an unimproved road: "There hasn't been a time since the first of December that I have been able to get anything hauled to my place from Meridian, just 4 miles, for less than 25 cents per hundred; in the majority of cases it has cost me as high as 50 cents, and a good many times it has been impossible to get it at any price. The people in my community have actually had to go without oil for their lamps for a week at the time, because they couldn't get it. If these conditions are not a heavier tax on the people than paying for the construction of roads, then I am a bad judge and a bad mathematician."

#### Look Out For Road Swindlers.

There are always swindlers hanging around every great enterprise, particularly those of a national character. Everybody well acquainted with the history of road propaganda knows of some of these rascals and has expected some of the breed to try to turn a dishonest penny in connection with the federal aid road law. One such has already made his appearance in one state. He claimed to represent one of the numerous associations advocating the construction of through highways. He urged communities to join his organization on the ground that through its help a federal aid road could be secured for the districts. The United States government is now attending to his case, so this particular incident may be considered closed. But there is every probability that like attempts will be made to swindle towns, cities and commercial organizations with an assertion of influence in the selection of roads to receive federal aid. Such assertions are absolutely without foundation, and, in the interest of good roads and good government, they should be reported immediately to the United States Office of Public Roads at Washington. Any district or organization which wishes to secure federal aid in road building must take the matter up with the state highway department of its state, for the United States, under the law, can deal only with state highway departments in extending aid for road building. It is a reasonable inference from the facts that anybody who claims an association he represents can influence the United States government in this work should be regarded with suspicion.

#### Paying For Good Highway Bridges.

No matter how good the surface of a road may be, if the bridges are weak and the culverts poor, the highway is far from satisfactory. The annual record of bridge failures under threshing machine and other heavy loads makes a long list, and the cost of repairing the annual damage to poor culverts is a large sum. In progressive communities, therefore, strong steel and concrete bridges and well built culverts are being constructed before expensive road surfacing is done. This work is often paid for out of the annual tax levy for road and bridges construction, and absorbs such a large part of the funds that too little money is left for grading and surfacing. Good bridges and culverts are permanent structures, and the Deputy Minister of Highways of Ontario, Hon. W. A. McLean, has advised the taxpayers of that province to pay for them by a bond issue where the total expenditure for the purpose is large. In such a case he suggests compiling a complete list of the bridges and culverts needed, preparing plans and estimates for their construction, and

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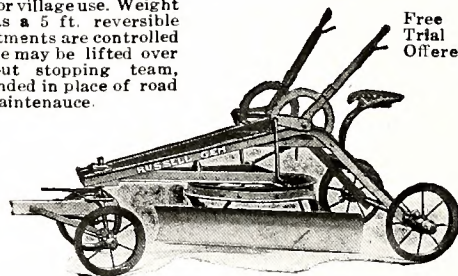
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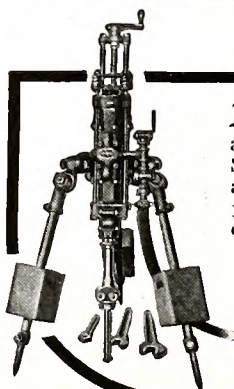
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then financing the work so that its cost will be equitably distributed over a period of years rather than be concentrated on the taxpayers of a few years. Where there are few of these structures and none is expensive, the policy of paying for them out of the annual tax levy cannot be criticized, in his opinion, for it does not interfere appreciably with satisfactory progress in grading, drainage, surfacing and maintenance.

#### Conference on Federal Aid Road Building.

Last month representatives of most of the states met in Washington at the invitation of the U. S. Office of Public Roads and Rural Engineering in order to discuss some of the methods of administering the new law giving federal aid to the states for road building. Congress provided that before any federal aid is given for any road, a number of preliminary steps must be taken by the state in which the road lies, and the entire work must be subject to regulations, issued by the Secretary of Agriculture, to make sure that the statutory requirements are fulfilled. The meeting was called in order that all features of the law might be discussed and the full meaning of some proposed regulations might be explained to the state officials. By this means, each state has been given an opportunity to criticize any of the regulations which it considered too onerous for its local conditions, before they were officially issued. The department of agriculture has also had the benefit of the advice of roadbuilders from all parts of the country. This cooperation of nation and states at the outset of the federal aid work disproves the prediction that the federal roadbuilders would be intolerant of any suggestions from the state officials, for the latter were invited at the very beginning of the work to assist in what is strictly a federal responsibility in the joint undertaking.

#### Louisiana Parish Progresses.

Tangipahoa parish is forging to the front as one of the most progressive road-building sections in Louisiana. Contracts have been recently let for more than a hundred miles of good roads in various sections, and they will be supplemented by others. Only a few years ago Tangipahoa bore an unenviable reputation for one of the poorest road systems in the state, and it was an insuperable obstacle to progress.

With the election of progressive members to serve as police jurors a few years ago, a movement was begun for good roads. It met the approval of business men, and many miles of improved highways have been added to the system here.

Before the elapse of another year, Hammond and Independence will be connected by a model road now in the course of construction. Its completion will mark an important epoch in the progress of the parish. With the steady influx of northern home-seekers, Tangipahoa will be in a position to offer superior inducements for those who seek to establish themselves in a community where the best of roads are maintained.

#### STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of Southern Good Roads published monthly at Lexington, N. C., for Oct. 1, 1916.

State of North Carolina, County of Davidson, ss:

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared Fred O. Sink, who, having been duly sworn according to law, deposes and says that he is the Secretary-Treasurer of the Southern Good Roads and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Southern Good Roads Publishing Co., Lexington, N. C.

Editor—H. B. Varner, Lexington, N. C.

Managing Editor—E. E. Witherspoon, Lexington, N. C.

Secretary-Treasurer—Fred O. Sink, Lexington, N. C.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

H. B. Varner, Lexington, N. C.

Fred O. Sink, Lexington, N. C.

G. W. Johnson, Greensboro, N. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: NONE.

FRED O. SINK, Sec.-Treas.

Sworn to and subscribed before me this 23rd day of October, 1916.

W. H. MENDENHALL,

(My commission expires, 9-27, 1917.)

#### We Have SEVERAL GOOD POSITIONS

Open in different sections  
of the country for

#### COMPETENT ROAD MACHINERY SALESMEN

Permanent places on  
STRAIGHT SALARY and EXPENSE or  
SALARY and COMMISSION

THE AUSTIN-WESTERN ROAD MACHINERY CO.,  
CHICAGO

# ATLANTIC

## Asphalt Products



Ask  
The ATLANTIC REFINING CO.  
Philadelphia and Pittsburgh



## An Open Letter



Messrs. James H. Sullivan  
John R. Rablin

Hector J. Hughes  
Arthur W. Dean

Guy C. Emerson

(Committee appointed by the Mayor to consider the Paving Problems of the City of Boston)

Gentlemen:

Our attention has been called to your report dated June 15, 1916, submitted to the Hon. James M. Curley, Mayor of Boston, with special regard to bituminous road binders.

We quite agree with your statement as follows:

"The necessity for carefully prepared specifications and close inspection of residual asphalt is due in some measure to the multiple sources of the material and to the varying methods used by the many producers in preparing it for use as a road or pavement binder."

With reference to the foregoing, it is a fact that there are many asphalts produced from various sources which are of uncertain quality and not uniform in character.

Many oil companies are producing asphalt as a by-product, their attention being primarily directed to the manufacture of oils for illuminating and lubricating purposes. On the other hand, there are other manufacturers whose chief production is asphalt. The asphalt products of these two classes of refiners should not be confounded. The year 1916 has given ample demonstration of this as the large oil companies have been short of asphalt due to production of lubricating oils which have yielded greater returns than the production of asphalt. On the other hand, the companies engaged chiefly in the production of asphalt have been able to supply their patrons as regularly as ever. To those of us engaged only in the production of asphalt the following paragraph in your report is an injustice:

"All oil asphalts are residual products from the distillation of petroleum for the purpose of obtaining more valuable products, whereas lake asphalt is a product prepared exclusively as a pavement binder, which explains the more general uniformity of quality as compared with the residual asphalts."

"It is the lack of uniform quality in the residual asphalts that lends justification to the use of the lake products where proper inspection cannot be obtained."

We are solely in the business of producing asphalt and asphaltic products. Whatever distillates may be produced in the refining process are a side issue with us.

AZTEC asphalt is produced from a heavy crude Mexican maltha—the word "maltha" is defined by Webster as "fluid bitumen or liquid asphalt; viscoid and tenacious like pitch."

Heavy crude Mexican maltha upon analysis shows the following:

Asphalt .....	70-75 per ct.
Light oils .....	29-34 per ct.
Water .....	1 per ct.

Whereas crude pitch-lake asphalts in their original form show the following:

LAKE ASPHALT A		LAKE ASPHALT B	
Asphalt .....	39.3 pct.	Asphalt .....	62 pct.
Water and gas .....	30.2 pct.	Water .....	33 pct.
Mineral and vegetable matter .....	30.5 pct.	Mineral and vegetable matter .....	5 pct.
100 pct			

The foregoing example means that the lake asphalts when refined and then made ready for use in pavements must have added to them either an asphaltic, semi-asphaltic or paraffine residuum varying in quality and the quantity to be determined by the characteristics of the special flux which may be used when ready for the paving operation. This uncertainty and variation in regard to the cements and binders from lake asphalt renders them, if anything, more liable to be ununiform than the so-called residuals. On the other hand, AZTEC from crude Mexican maltha is produced ready for use at the proper consistency desired.

Reverting to the production of asphalt from heavy Mexican crude maltha, we would point out that a material which produces 70 per cent of asphalt, selling in bulk today at 6½¢ per gallon; 25 to 28 per cent of distillate at 4¢ per gallon; and less than 1 per cent of gasoline at about 16¢ per gallon cannot, in all fairness, be characterized as a residual. Asphalt yields more than three times the value of the oils financially, therefore AZTEC asphalt cannot be truthfully characterized as a "residual produced from the distillation of petroleum for the purpose of obtaining more valuable products."

Furthermore, as to uniformity of our product, we have only to point to the five year record of AZTEC asphalt laid in the leading cities of the United States and Canada, with the demand at the present time greater than ever and constantly increasing.

Respectfully

THE UNITED STATES ASPHALT REFINING CO.

Signed by

J. R. DRANEY  
Sales Manager  
90 West Street  
NEW YORK













